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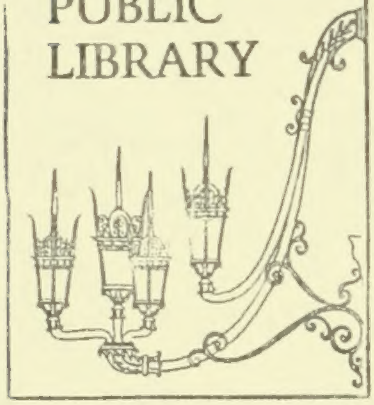

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PARK PLAZA
ENVIRONMENTAL IMPACT REPORT
PRELIMINARY DRAFT

SUPPLEMENTAL ANALYSIS

Circa 1975

VOLUME I
THE ENVIRONMENT

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PART IV
THE PARK PLAZA PROJECT ENVIRONMENT

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PREPARED BY:

THE BOSTON REDEVELOPMENT AUTHORITY

WITH THE ASSISTANCE OF

THE SARATOGA ASSOCIATES

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PART IV THE ENVIRONMENT OF THE PARK PLAZA PROJECT

INTRODUCTION

As described in the overall introduction to this report, one of the major tasks of environmental impact analysis is to define and describe those conditions or characteristics of the environment that will be affected by the development of the project.

This part of the Building Study Stage Environmental Impact Statement sets forth the methodology and approach to this task, as governed by the criteria indicated below, and then displays the environmental base analysis (EBA) models used in Part VI to test and evaluate alternative development program interpretations for the Park Plaza project.

CRITERIA FOR ENVIRONMENTAL BASE ANALYSIS MODEL DEFINITION AND DEVELOPMENT

To be effective instruments for environmental impact analysis, the environmental base analysis (EBA) models must be

responsive to and reflective of several criteria:

A. The EBA models must be relevant, i.e. capable of defining which particular environmental conditions or characteristics will, in fact, be changed by the development of the project.

B. The EBA models must be comprehensive, i.e. capable of describing the environment in terms of natural physical, built physical, social-political and economic conditions or characteristics.

C. The EBA models must be dynamic, i.e. capable of describing the environment in relation to the general point in time at which a particular phase of development activity takes place, and in relation to the probable sequence of impact relationships, wherein direct impacts on one particular condition or characteristic indirectly alter other particular conditions or characteristics.

D. The EBA models must be analytically useful, that is capable of describing environmental conditions or characteristics in a manner which will permit the testing and comparative evaluation of the specific impacts of alternative development pro-

grams as to their duration (permanent or long-term versus temporary or short-term) nature (adverse, beneficial or neutral effects) scope (on-site versus off-site, local versus regional) and the magnitude, or degree of change effected. This base must also be capable of addressing both the quantitative aspects of the change and the qualitative aspects of the change - requiring some determiniation of thresholds which, when surpassed, indicate changes in the significance of the impact.

ENVIRONMENTAL BASE ANALYSIS (EBA) METHODOLOGY AND PROCESS

Prior to the third submission of the Park Plaza project to the Massachusetts Department of Community Affairs, the Boston Redevelopment Authority retained The Saratoga Associates to prepare an objective summary description of the potential environmental impact issues of the Park Plaza project. That report analyzed the potential environmental impacts of the project using a matrix device to identify the relationships between 47 separate proposed development activities and 250 separate parameters of environmental concern. The latter material spanned the full range of meaning in the term "environment" by including natural physical, built physical, social-political, and economic considerations.

The 250 conditions or characteristics of the environment are grouped into four major components, each with several subdivisions, as follows:

1. The Natural Physical Environment
    - Land Form
    - Geology
    - Surficial Geomorphology
    - Air Resources
    - Climate
    - Surficial Hydrology
    - Subsurface Hydrology
    - Vegetative Resources
    - Faunal Resources
2. The Built Physical Environment
    - Perceptual Environment
    - Land Use
    - Built Character
    - Circulation
    - Utilities
3. The Social-Political Environment
    - Demographic Structure
    - Group Structure
    - Political Structure
    - Functional Services

4. The Economic Environment
    - Public Economic Sector
    - Private Economic Sector

It should be noted that so-called "community" or "neighborhood" impacts are not covered in the matrix since they represent a format or method of reporting or presenting the individual impacts as identified above - in other words, the impacts on a particular community are compilations of those impacts on the natural physical, built physical, social-political, and economic components of the environment that pertain to that particular community, as will be seen in later sections of this report.

Two other terms used in the matrix also need to be explained further:

"System" has two meanings and these are used differently in the phases indicated.

1. In the demolition, excavation and site preparation, and construction phases "system" means the physical structure for providing a particular service.
2. In the relocation and use and occupancy phases "system" means the particular functional program or programs provided by a particular service.

"Capacity" also has two meanings as associated with different phases:

1. In the demolition, excavation and site preparation, and construction phases, "capacity" means the actual physical capacity of a particular service facility or utility.
2. In the relocation and use and occupancy phases "capacity" means the demand for the use of a particular service or utility.

ENVIRONMENTAL CHARACTERISTICS

NATURAL PHYSICAL (N)

LAND FORM	
Topography	N01
Slope	N02
BEDROCK GEOLOGY	
Bedrock Type	N03
Bedrock Depth	N04
Bedrock Contour	N05
Bedrock Thickness	N06
Bedrock Strength	N07
Seismic Stability	N08
Faults & Fractures	N09
Outcrop Locations	N10
Rock Aquifer Locations	N11
Unique Rocks/Fossils	N12
SURFICIAL GEOMORPHOLOGY	
Geomorphic Type	N13
Soil Series	N14
Soil Profile	N15
Soil Composition	N16
Soil Depth	N17
Soil Texture	N18
Soil Permeability	N19
Soil Bearing Capacity	N20
Soil Acidity	N21
AIR RESOURCES	
Particulate Level	N22
Particulate Type	N23
Odor	N24
CLIMATE	
Air Temperature	N25
Precipitation	N26
Humidity	N27
Snow Accumulation	N28
Wind Direction	N29
Wind Speed	N30
Solar Orientation	N31
Solar Exposure	N32
Evaporation/Transportation	N33
SURFICIAL HYDROLOGY	
Water Resource Type	N34
Size (area length, width	N35
Drainage Area	N36
Depth	N37
Flow Rate	N38
Volume/Capacity	N39
Residence Time	N40
Temperature	N41
Dissolved Oxygen	N42
pH	N43

Color	N44
Turbidity	N45
BOD	N46
Coliform	N47
Nutrient Level	N48
Mineral Level	N49
Conductivity	N50
Odor	N51
SUBSURFACE HYDROLOGY	
Aquifer Location	N52
Well Location	N53
Water Table Depth	N54
Water Table Contour	N55
Aquifer/Well Yield	N56
Lateral Flow Rate	N57
Nutrient Level	N58
Mineral Level	N59
Conductivity	N60
Odor	N61
pH	N62
VEGETATIVE RESOURCES	
Species	N63
Quantity	N64
Community/Series	N65
Area	N66
Size	N67
Form	N68
Color	N69
Texture	N70
Fruit	N71
Age . Condition	N72
Condition	N73
Uniqueness	N74
FAUNAL RESOURCES	
Species	N75
Population/Density	N76
Territorial Request	N77
Habitat	N78
Food	N79
Residence Duration	N80
Condition	N81
Uniqueness	N82

BUILT PHYSICAL (B)

PERCEPTUAL ENVIRONMENT

Sound Level	B01
Sound Quality	B02
Vibration Level	B03
Vibration Quality	B04
Scenic Features	B05

LAND USE

Land Use Type	B06
Land Use Area	B07
Land Use Distribution	B08

BUILT CHARACTER

Structural Coverage	B09
Structural Height	B10
Floor Area	B11
Spatial Form	B12
Vision Zones (MACRO)	B13
Profile . Day	B14
Profile . Night	B15
Visual Zones (MICRO)	B16
Structural Condition	B17
Site Amenities	B18
Unique Structures	B19
Unique Quality	B20
Archeologic Features	B21

CIRCULATION

Highway System	B22
Highway Capacity	B23
Parking System	B24
Parking Capacity	B25
Service Access	B26
Pedestrian System	B27
Pedestrian Capacity	B28
Public Transit System	B29
Public Transit Capacity	B30
Rail System	B31
Rail Capacity	B32
Air Transport System	B33
Air Transport Capacity	B34
Water Transport System	B35
Water Transport Capacity	B36

UTILITIES

Power Supply System	B37
Power Supply Capacity	B38
Water Supply System	B39
Water Supply Capacity	B40
HP Water System	B41
HP Water Capacity	B42
Fuel Supply System	B43
Fuel Supply Capacity	B44
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Telephone Capacity	B46
Public Signal System	B47
Public Signal Capacity	B48
Sanitary Sewer System	B49
Sanitary Sewer Capacity	B50
Storm Drain System	B51
Storm Drain Capacity	B52

SOCIAL-POLITICAL (S)

DEMOGRAPHIC STRUCTURE

Population Size	S01
Population Density	S02
Population Distribution	S03
Age Characteristics	S04
Sex Characteristics	S05
Ethnic Composition	S06
Marital Status Character	S07
Occupational Character	S08
Income Character	S09
Educational Level Character	S10
Family Structure Character	S11
Family Size Character	S12

GROUP STRUCTURE

Institutions Type	S13
Institutions Size	S14
Institutions Character	S15

POLITICAL CHARACTER

Political District	S16
Political Composition	S17

FUNCTIONAL SERVICE

Educational System	S18
Educational Capacity	S19
Health Services System	S20
Health Services Capacity	S21
Social Services System	S22
Social Services Capacity	S23
Police Protection System	S24
Police Protection Capacity	S25
Fire Protection System	S26
Fire Protection Capacity	S27
Emergency Prep. System	S28
Emergency Prep. Capacity	S29
Parks & Recreation System	S30
Parks & Recreation Capacity	S31
Cultural Services System	S32
Cultural Services Capacity	S33
Solid Waste Mg'mt. System	S34
Solid Waste Mg'mt. Capacity	S35
Gen. Govt. Service System	S36
Gen. Govt. Service Capacity	S37

ECONOMIC (E)

PUBLIC ECONOMIC STRUCTURE

Taxable Property Value	E01
Real Property Tax Rate	E02
Property Tax Revenue	E03
Non-Property Tax Revenue	E04
User Fee Revenue	E05
Inter Govt. Transfer Rev.	E06
Other Revenue	E07
Bonded Indebtedness	E08
Debt Margin	E09
Debt Service Costs	E10
Public Housing Cap. Invest.	E11
Public Housing Oper. Expense	E12
Housing Subsidy Expense	E13
Education Cap. Invest.	E14
Education Oper. Expense	E15
Health Service Cap. Invest.	E16
Health Service Op. Expense	E17
Social Service Cap. Invest.	E18
Social Service Op. Expense	E19
Police Protect. Cap. Invest.	E20
Police Protect. Op. Expense	E21
Fire Protect. Cap. Invest.	E22
Fire Protect. Op. Expense	E23
Emer. Prep. Cap. Invest.	E24
Emer. Prep. Oper. Expense	E25
Park & Rec. Cap. Invest.	E26
Park & Rec. Oper.	E27
Cultural Serv. Cap. Invest.	E28
Cultural Serv. Op. Expense	E29
Solid Waste Mgmt. Cap. Invest.	E30
Solid Waste Mgmt. Op. Expense	E31
Gen. Govt. Serv. Cap. Invest.	E32
Gen. Govt. Serv. Op. Expense	E33
Water Supply Cap. Invest.	E34
Water Supply Op. Expense	E35
Sewer System Cap. Invest.	E36
Sewer System Op. Expense	E37
Storm Drain Cap. Invest.	E38
Storm Drain Op. Expense	E39
Public Signal Sys. Cap. Invest.	E40
Public Signal Sys. Op. Expense	E41
Public Transit Sys. Cap. Invest.	E42
Public Transit Sys. Op. Expense	E43

Other Trans. Sys. Cap. Invest.	E44
Other Trans. Sys. Op. Expense	E45
PRIVATE ECONOMIC STRUCTURE	
Capital Investment-Land	E46
Capital Investment-Bldgs.	E47
Capital Investment-Equip.	E48
Personal Income	E49
Rental/Lease Income	E50
Sales Income	E51
Interest Income	E52
Rental/Lease Expenses	E53
Payroll Expenses	E54
Utility Service Expense	E55
Inventory Expense	E56
Taxes	E57
Interest Expense	E58
Operation & Maint. Expense	E59

As a result of that analysis, and a proposed work program to conduct an in-depth analysis of the actual impact issues, the Park Plaza project was given approval contingent upon the preparation of a supplemental Environmental Impact Statement based upon the urban renewal plan for the project and building study stage exploration of development program alternatives.

In approaching the task of constructing the environmental base models for this analysis, the same basic matrix was utilized. The 47 separately-defined development actions were combined, however, into seven principal phases of project execution. Because of the interest in the identification of temporary, beneficial, and local impact issues, an entire re-evaluation of the environmental impact issues was conducted (see Appendix Report). Within this process, substantial effort was also given to the identification of indirect (second and third order) impacts - which in essence are changes in environmental conditions or characteristics which occur due to impacts of environmental conditions changed directly by development actions.

The construction of environmental base model flows directly from the assessment of impact issues. At the onset of any particular phase, only those environmental characteristics affected by actions occurring during that phase form the "model".

Any given environmental quality may be altered as a result of first, second, third or any number of impacts. Since they usually occur simultaneously, these impacts are additive. As an example, sound level changes may occur after the first order influx of population, and as a result of increased public transit usage. Theoretically, these sound level changes remain permanent throughout the remainder of the development process, and perhaps continue for several years.

The dynamic nature of the Environmental Base of a project generates many complexities. The impacted geographic area (site, neighborhood, region) varies, depending upon the development program action considered. Of course, the basic nature of the environment is the interdependencies among its various parts. With the actions of the development process, one environmental change will activate a chain reaction of changes, each with its own area of impact on the natural, built-physical, social-political, and economic environment. The task of environmental analysis is to "freeze the ripples in the pond," to describe and measure the changes occurring in the environment at particular moments.

The environment of any given area is changed not only by the development project under consideration, but also by external

influences such as projects or decisions by other agencies and interests. Often, these external influences are hard to measure, mainly due to a lack of predictable futures. The consideration of these outside influences can confuse the true nature of on-site issues. Where possible, this analysis has incorporated the impacts of such external forces as probable development projects by others.

The environmental base "model" is really several models, each describing the environmental state at the start of a particular development phase.

The model is represented by those characteristics which comprise the affected environment. Since different characteristics are affected during the various phases, the various base models are separate entities. The list of first order impacts is indicative of the variety of environmental characteristics affected from one phase to another. Second and third order impacts involve an even greater range of environmental parameters.

The state of the environment is defined by those parameters which may change significantly through impacts about to occur. Describing parts of the environment on the verge of change is the essence of the base.

In the context of an elaborate development process where the environment undergoes succeeding changes, the base must be viewed as a *dynamic* or consisting of a *changing set of characteristics*. Often, early impacts will alter the environment permanently; thus the base changes in scale and area to reflect an assessment of imminent impacts. While a description of the site *may* suffice for immediate physical changes of early development stages, later phases may impart economic and social impacts on a larger area - often, the city or region.

Thus, each development phase, with its unique forms of impact, sets the stage for a new description of the environment. Although the base can be simplified in the actual analysis by correlating those phases of development which occur in close succession to one another, an outline of the phase conditions is useful to clarify the concept.

PHASE A ACQUISITION

DPI Actions

Acquisition Phase activities include the public acquisition of real property for redevelopment purposes. Acquisition applies to all real property included in the project area, thus affecting those public capital investments located in the area as well as the private capital investments. For the purposes of environmental impact analysis, it is assumed that the acquisition phase only affects ownership, but not the existing use and occupancy.

EBA Characteristics

At this point, the environment is described as it exists prior to the formulation of the urban renewal plan and to the site designation and acquisition as an urban renewal project. No significant, previous actions have occured on-site, only the changes occurring within the current land use and development pattern. Since this phase is generally represented only by economic impacts, these are the characteristics which sufficiently define the environment.

The major concern of acquisition impacts is the public and private economic structure as these pertain to capital investment in property and improvements. Geographically, the base is limited to the immediate project site and environs, and to the city as a whole.

PHASE B RELOCATION

DPI Actions

Relocation Phase activities include the termination of existing use and occupancy. This activity abruptly changes the demographic characteristics of the site environment, and (concurrently) alters land use and user demands on the on-site and off-site circulatory, utility and functional services used by site inhabitants, thereby affecting the capacities of these existing systems. Private economic activity related to the existing site also ceases.

EBA Characteristics

At this point, the environment has changed only in the sense of legal ownership. This base assumes a continuation (how-

ever brief) of the occupancy and use of the existing site. Since this phase is concerned primarily with the relocation of these activities, demographic and economic characteristics are the key concern. Relocation also relieves the demand on circulation, utility and function service systems, but in a densely developed urban area, these impacts are beneficial and usually negligible as pressures from surrounding areas take up the slack in demand. Geographically, this base is concerned with the immediate site, nearby environs, and the regional area of potential relocation.

PHASE C DISPOSITION

DPI Actions

Disposition Phase activities include the sale of the project property to public and private redevelopment interests, thus re-establishing a new mix of public-private ownership patterns. While, in practice, the entire site is generally transferred to private interests for demolition and site preparation purposes - with portions of the redeveloped site used for public purposes eventually deeded back to the government or public agencies operating such - for the purpose of environmental impact analysis it is assumed that

disposition for all ultimate uses takes place concurrently.

EBA Characteristics

This base model shows the existing site but one which is empty of human activity. The structures still stand awaiting disposition and clearance. Since the development action is essentially legal and economic, the public and private economic structure characteristics are sufficient to describe the base. In a geographic sense, the base is limited to the immediate project site, and beyond that the City as a whole.

PHASE D DEMOLITION

DPI Actions

Demolition Phase activities include the removal of the subsurface and surface structures on the site. Concurrent with the removal of structures and site amenities, on-site circulation, utility, and functional service systems are immediately changed. Changes in these on-site systems can affect the capacities of some nearby off-site systems as well

by altering patterns of demand or use.

EBA Characteristics

At this point, the base is similar to that of Phase C, except that ownership has again changed in character. Since this base shows the site immediately prior to demolition, the built physical characteristics are the most important consideration - along with the physical characteristics of on-site circulation, utility and functional service systems. Geographically, the site is of primary concern, but indirect impacts also require consideration of nearby environs.

PHASE E EXCAVATION AND SITE PREPARATION

DPI Actions

Excavation and Site Preparation Phase activities include the alterations to the natural earth, vegetative and faunal resources of the project site prior to the commencement of actual construction of foundations for new development. Private capital investment for buildings and equipment used during construction is also included in this phase.

EBA Characteristics

The environment represented by this base depicts the site now cleared of previous structures and improvements but prior to the commencement of new construction activities, awaiting the excavation process. Thus, the subsurface characteristics - soil and goundwater are the most significant considerations. Since the major construction force is mobilized at this time, demographic characteristics of the labor force are of concern, along with private economic structure elements that display labor force costs and the capital investment in real property used during construction and equipment. Geographically, the site and nearby environs are important, together with the regionally distributed origins of the labor force and construction industry.

PHASE F CONSTRUCTION OF NEW DEVELOPMENT

DPI Actions

Construction Phase activities include the development of new buildings, circulatory and utility systems and those functional services to be provided directly on site. Concurrent with the provision of this new permanent capital investment

(both public and private) in buildings and fixed equipment are changes to the circulatory, utility, and functional service systems. New vegetative and faunal resources may also be added to the environment at this time.

EBA Characteristics

At this point, the base consists of the site with holes dug to receive basic foundation elements, and the subsequent superstructure of new buildings. Built physical environmental characteristics are of primary importance and the base reflects these. New structures can also cause micro climate changes and so the base is concerned with the immediate environs as well.

PHASE G OCCUPANCY AND USE OF THE PROJECT

DPI Actions

Occupancy and Use Phase Activities include the repopulation of the project area, and concurrent development of new demands affecting the capacities of on-site and off-site circulatory, utility and functional services used by site inhabitants. Land use activity changes, and private economic activity related to the new project commence.

EBA Characteristics

The base shows the environment with new physical additions, but just prior to the commencement of occupancy and use. Thus demographic characteristics again become important considerations. Demands are about to be reloaded onto circulation, utility and functional service systems. The economic component of the environment will also be altered significantly. Indirect impacts extend the concern of this base broadly across the full spectrum of environmental characteristics. Geographically, the base affects an equally broad spectrum range from the site itself to the entire region.

Impacts on nearby neighborhoods and communities are also important considerations of this base.

To construct the environmental base analysis models for the Park Plaza Project, the following procedure was utilized:

1. The first step was to define those developmental actions or activities which were likely to generate changes in the existing conditions or characteristics of the environment. These actions or activities were grouped into the seven major phases of development as identified earlier. The seven phases are characteristic to most development projects and, like the environmental base definition, represent a generic procedure that can be applied to the EIS for any project.

2. Each of the above phased development actions or activities was then applied to the list of 250 parameters describing conditions or characteristics of the environment to determine which of these parameters might possibly be affected by the particular development action or activity. This resulted in a list of

potential first order (or direct) environmental impacts. This also resulted in a generic system, since each development action or activity was evaluated without reference to any particular project location, or any particular purpose.

3. Each parameter of the environment changed by a direct development action sets off subsequent changes to other parameters. For example, the construction of buildings results in changes in shadow patterns, which can subsequently cause changes in pedestrian circulation patterns. This analysis was carried to the third order of sequence, at which point it was determined that the ability to precisely track the sequence of changed environmental conditions was either complicated by the need to consider exogenous (external) factors not related to the project, or the subsequent impacts became a cyclical, or recurring, phenomena. For example, the population of the new development obviously affects the capacity of circulation systems, causing changes to the system, which result in increases in system capacity, which attract more traffic, etc. In fact, the phenomena is most universally recognized in the way new highway arterials generally result in increased auto

usage, which again congests the system requiring more new arterials.

4. At this point, the generic array of potential environmental impacts was established. The next step was to relate the list of potential impacts to the specific development program and environmental base of Park Plaza. This was initially accomplished by evaluating each of the five alternative development alternatives to the general environmental setting for Park Plaza. The result was the deletion of a number of development impacts that were not applicable to Park Plaza. The project does not envision, for instance, major changes in basic land form and topography.

5. This step involved the assignment of a preliminary rating of impact significance. We can generally determine, without specific information, if an impact is going to be permanent or temporary, adverse, beneficial or neutral, regional or local. We can also generally determine whether the commitment of the environmental resource will be reversible or irreversible, program generated or design generated, controllable by the agency responsible for the development or requiring actions by other public agen-

cies, and whether the technology or program to control the impact exists at hand, or is a future programmed activity.

6. At this point, the impacts can be redefined as "probable" impacts. These probable impacts were again evaluated and those generated by the development were selected for analysis during the Building Study Stage. Those impacts which were rated as beneficial, and those impacts which were rated as unpredictable, were usually deleted from rigid analysis, although some were retained where it was felt that some subjective comment might be required.

7. The probable issues susceptible to quantitative analysis and resolution were again extracted for evaluation. Data and informational needs to resolve these issues were then specified. If reliable data were not available or obtainable, these issues, where important, were deferred for further study during middle stages of the development process.

8. At this point, the data and information needed to resolve the critical Building Study Stage environmental impact issues was obtained and analyzed. This analysis included not only the description of the

environmental base parameter affected, but the evaluation of tolerance of the particular condition or characteristic to accept increased loads.

9. The analytical results were evaluated and organized into the seven base models which were further consolidated to conform with three basic milestone years - the 1975 Test Base (covering Acquisition, Relocation, Disposition and Demolition); the 1980 Test Base (covering Excavation and Site Preparation, and Construction); 1985 Test Base (covering Occupancy and Use). Ideally, each parameter of the base should be defined in terms of its condition or characteristic as of any given future year, but the projective science is not available at that degree of precision.

   At this point, the impact issues selected for Building Study Stage analysis were again evaluated. Those impacts which the analysis proved to be minor were then deleted from the testing program, as described in the Issue Resolution Appendix.

10. The resulting issue list was then used as the basic structure for defining criteria for testing and evaluating the impacts of the project.

THE GENERAL ENVIRONMENTAL BASE OF PARK PLAZA

Prior to undertaking a specific description of the potential environmental issues of the Park Plaza project, it is useful to review the general environmental setting for the project. The following pages describe that general setting as it existed around 1970 prior to the announcement of the project. The description is presented both in terms of the four component parts of the total environment - the natural physical, built physical, social political and economic - as earlier defined, and in terms of the community neighborhood context.

The purpose of this general description is to set a preliminary foundation for a more precise system of identifying and describing relevant environmental impact issues, and to provide the reader unfamiliar with the project with a basic understanding of the environment which is Downtown Boston.

The General Environmental Base is not used as a testing mechanism to evaluate project impacts. The "Testing" Base is presented following a summary description of the key environmental impact issues as described in the following Chapter. This test base consists of three "future" oriented descriptions of the environment as it is expected to be like at the time of acquisition, relocation, disposition and de-

molition (the 1975 test base); at the time of excavation, site preparation and construction (the 1980 test base); and at the time of occupancy and use of the completed development (1985).

It should be noted that a variety of environmental impacts have already occured as a result of the Park Plaza project. The announcement of the urban renewal plan in December, 1970, essentially removed the project area from "normal" urban land status, affecting its economic future. Delays in approval of the project have obviously had a detrimental effect on the physical condition of the area as existing property owners are naturally reluctant to invest in the maintenance of structures slated to be acquired and demolished. In addition, there have been impacts on the public economy as the costs of this and prior studies would indicate.

These impacts, while adverse, are essentially short-term impacts when viewed in relation to the overall project. In any event, they have occurred or are occurring now, and are not accounted for in this impact statement. Mitigating measures would naturally require the expeditious advancement of the project.

THE GENERAL NATURAL PHYSICAL ENVIRONMENT

Even though a development project is situated in the center of a densely built-up urban area, as Park Plaza is, there are many elements of the natural physical environment that will be affected by the project's direct and indirect impacts. As displayed by the environmental analysis matrix utilized in this assessment, the natural physical environment includes the following elements, as described in terms of the Downtown Boston setting.

Land Form

Land form is the general configuration of ground relief in a project environment. It can be described in terms of topography - or elevation of the ground surface; and slope. Park Plaza is located near the center of the contemporary Shawmut Peninsula on a site that straddles the western historic shoreline of the isthmus that in Colonial days connected the peninsula to the mainland. Thus the eastern half of the site has a natural ground elevation somewhat higher than the western portion of the site. Northward, from the western portion of the

site, the land to the east of Charles Street rises gently to form the south slope of Beacon Hill. The lower south slopes of Beacon Hill are the site of the Boston Common, directly across Boylston Street north of the project. South and east of the project, the natural land elevation is also higher, forming the ancient isthmus.

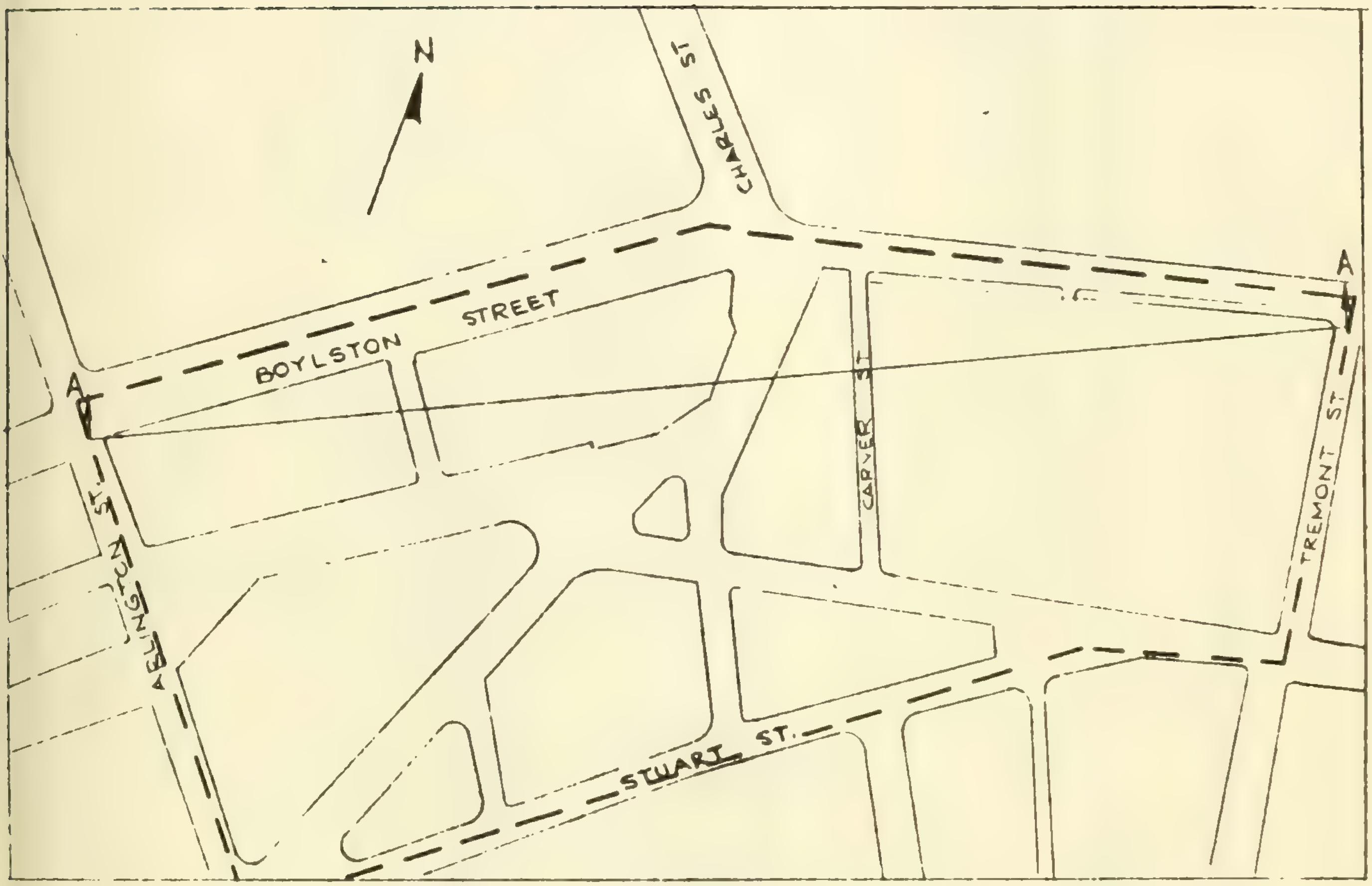
The land form environment of the western portion of the site is basically flat, with the natural elevation previously the bottom of the Back Bay marshes, which were later filled and extensively developed.

Thus, the Park Plaza project, while affecting topography momentarily during excavation activities, will have no effect on land form elevation or slope.

Bedrock Geology

The bedrock geology of the Park Plaza environment consists of the Cambridge Formation, deeply overlain (120'-140') by interbedded layers of sands and clays topped by the glacial till of the Shawmut Peninsula.

SCHEMATIC GEOLOGICAL SECTION



KEY PLAN

NOT TO SCALE

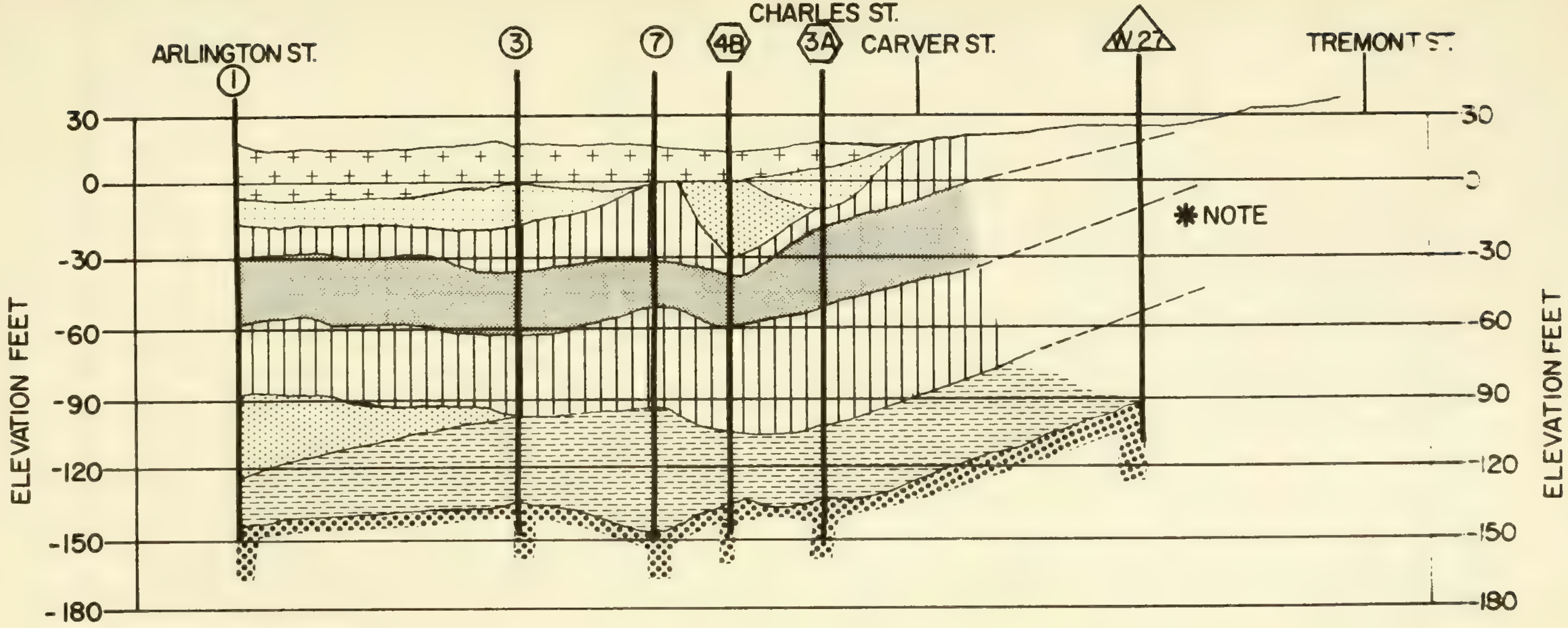
– – – – – BOUNDARIES OF STUDY SECTION

REFERENCE : "DEFINING THE ALTERNATIVES"
BRA. URBAN DESIGN STAFF
FEB. 4, 1975

JUNE 16, 1975 JOB NO 1749

SCHEMATIC GEOLOGIC SECTION

SCALE = 1" = 30'
REDUCED



STRATIGRAPHY

- ⊞ FILL
- ░ PEATS, ORGANIC SILTS
- ▥ STIFF CLAY WITH SAND LAYERS
- ▒ DENSE SAND AND GRAVEL
- ▓ COMPACT TO DENSE SAND WITH CLAY LAYERS
- ☰ GLACIAL TILL
- ▩ ARGILLITE

LEGEND

- ○ BORINGS BY RAYMOND, 1972
- ⬡ BORINGS BY RAYMOND, 1969
- △ BORING DATA FROM GREATER BOSTON, B.S.C.E., 1961
- | OBSERVATION WELL
- ▽ WATER LEVEL

✱ NOTE: MISC. BORINGS IN THIS AREA INDICATE LAYERED SANDS & CLAYS, SAND & GRAVEL & GLACIAL TILL PROBABLY VERY COMPLEX STRATIGRAPHY. . .

Generally, this is a fairly hard metamorphic cleavage and is classed as argillite. The formation sometimes contains interbedded sandstones, and diabase dykes and sills are often encountered.

In some areas, the argillite has been weathered or otherwise altered to a much softer, clayey consistency. Most of the boring logs for the Park Plaza area indicated the rock to be a fairly sound argillite, but softer, perhaps altered material was noted at the corner of Arlington and Boylston Streets and at the site of the new Howard Johnson Motel. There are no major faults in the bedrock geology of this area, and tectonics indicate a stable zone of low seismic activity.

Surficial Geomorphology

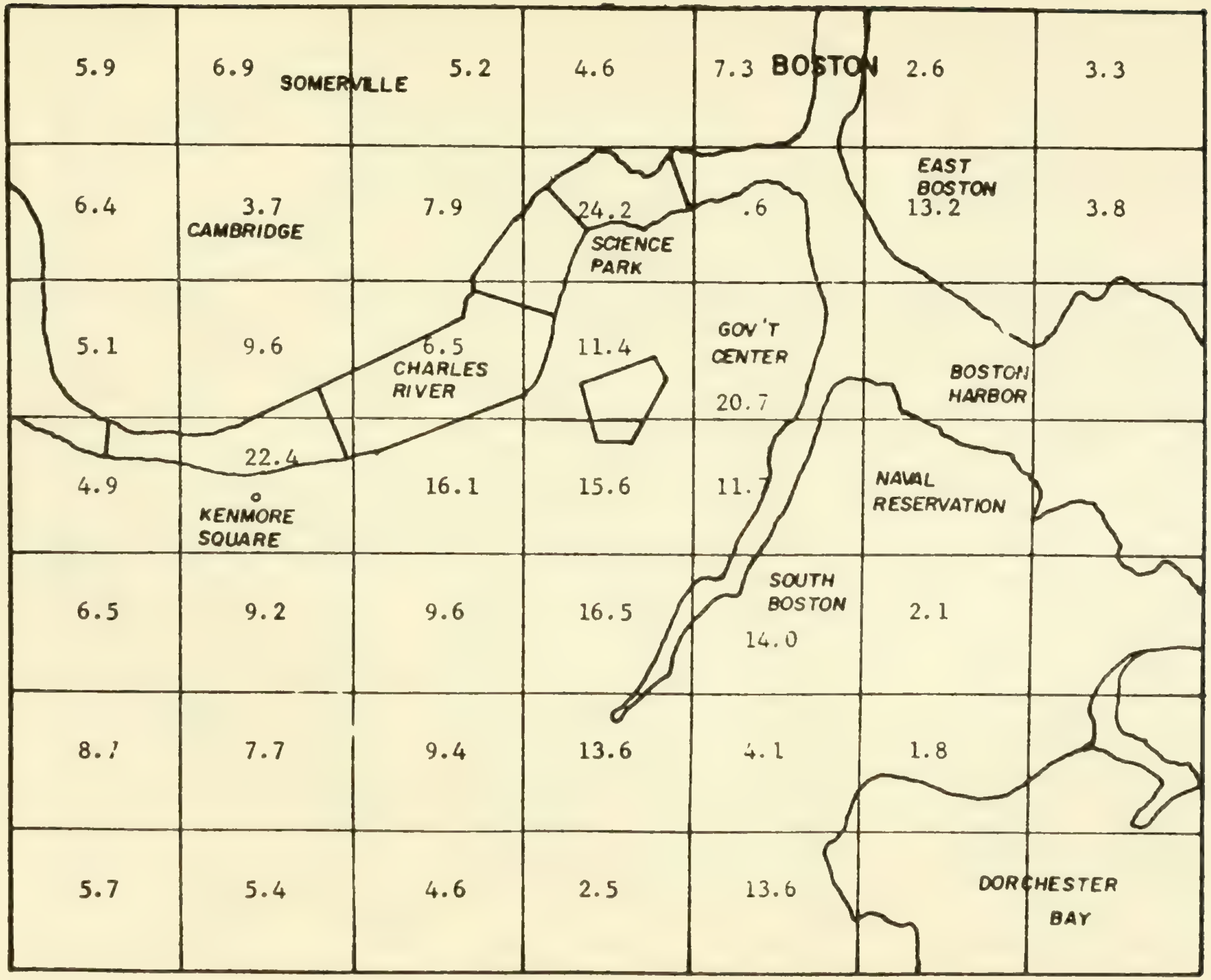
Surficial geomorphology refers to the structure of the earth at the surface of the ground - and primarily to soil characteristics. The project site is in a transitional zone between a "made-land" area of the filled Back Bay marshes and the glacial drift of the Shawmut Peninsula. Since the area is a partially filled, and highly manipulated urban setting, the topsoil zones of the area are all quite artificial. Even the Boston Common, which might be expected to have the most natur-

al soil base, is probably little reflective of the original natural organic soil, having been worked over by man and animals for the past 300 years or so.

Air Resources

The air resources, along with the general climate, are perhaps the most "natural" environmental resources of the Park Plaza area. Even the air resources, however, have been long affected by the human activity of the metropolitan region. The existing air quality of Downtown Boston, like many urban centers, reflects the extensive automotive congestion in the area (containing carbon monoxide, hydrocarbons and ozone emissions) the urban use (adding particulates of dust and ash and other substances) and the heating of the buildings and structures in the area (which generates the nitrous oxides, sulfates and other emissions). As shown, carbon monoxide levels in the Downtown Boston area in 1970 ranged from .6 to 20.7 ppm.

CURRENT DOWNTOWN CO LEVELS

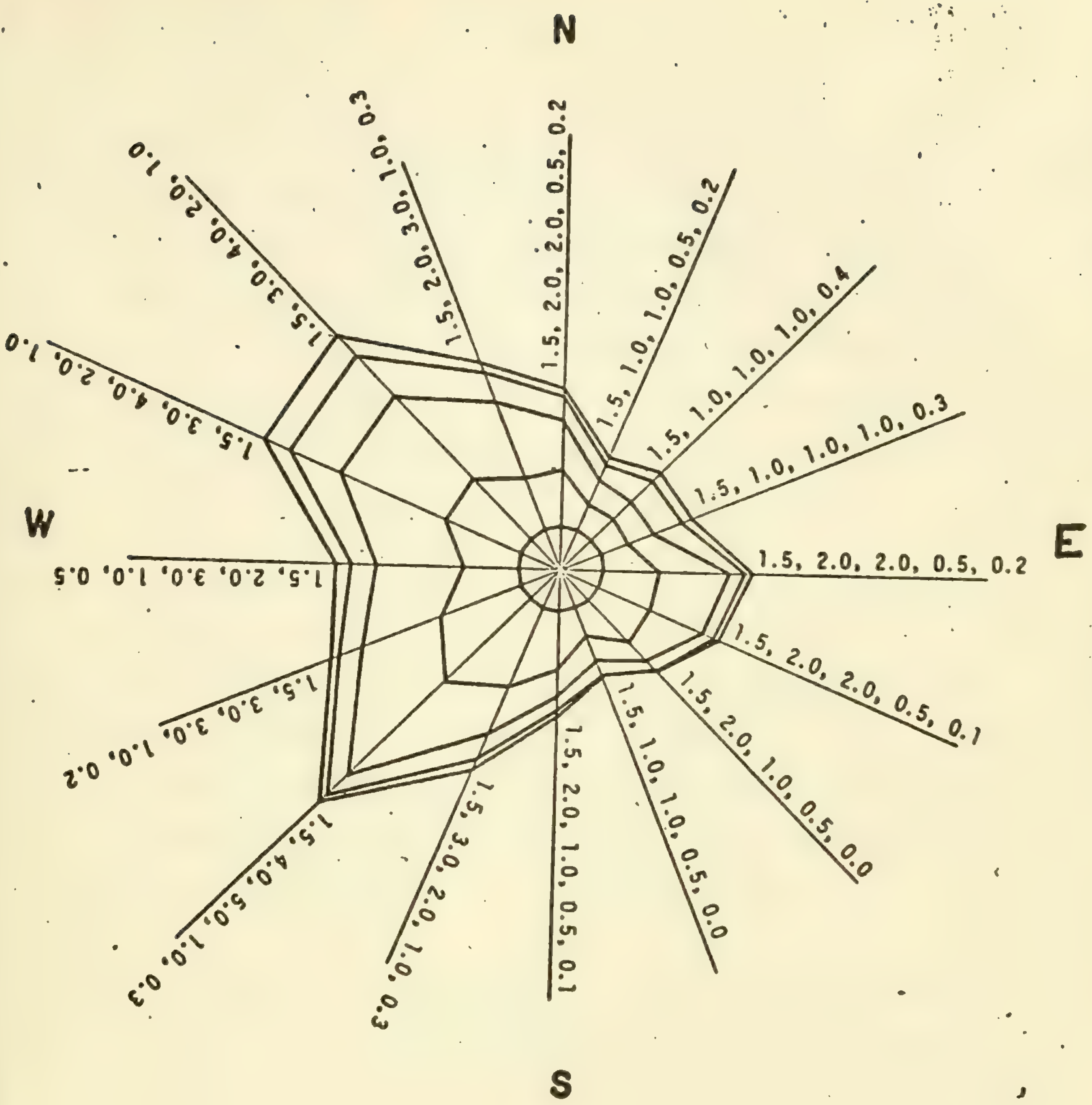


8-Hour Maximum Ambient Air Quality Estimates for Carbon Monoxide in 1970 (In PPM)

Climate

The general climatic conditions of the Park Plaza environment reflect the conditions of a coastal city in the northern temperate zone. The following is a general description of the Boston climate as prepared by the National Oceanic and Atmospheric Administration.

> "Climate is the composite of numerous weather elements. Three important influences are responsible for the main features of Boston's climate. First, the latitude (42^{0} N) places the city in the zone of prevailing west to east atmospheric flow in which are encompassed the northward and southward movements of large bodies of air from tropical and polar regions. This results in variety and changeability of the weather elements. Secondly, Boston is situated on or near several tracks frequently followed by systems of low air pressure. The consequent fluctuations from fair to cloudy or stormy conditions reinforce the influence of the first factor, while also assuring a rather dependable precipitation supply. The third factor, Boston's east-coast location, is a moderating factor affecting temperature extremes of winter and summer.
>
> "Hot summer afternoons are frequently relieved by the



Annual Windrose for Boston, Massachusetts

KEY: Directors are those from which the wind blows. The top vertical line represents North winds. Clockwise follow NNE, NE, ENE, etc. The innermost circle represents the percent occurrence of 0 - 7 mph winds. The first number expresses the numerical value of this occurrence to the nearest whole percent. Then, radiating outwards for each of sixteen compass points appear percentages for the occurrence of winds in 8 - 12, 13 - 18, 19 - 24, 25 plus mph speed ranges. Thus the sequence of numbers associated with a particular wind direction indicates the frequency of wind speeds in these ranges, 0 - 7, 8 - 12, 13 - 18, 19 - 24, and 25 mph and over, expressed as a percentage of the total, or 100%.

Data is presented for average annual occurrences. The data base is the National Weather Bureau of Hourly Observations for Boston, Massachusetts for the ten-year interval, 1951-1960.

locally celebrated 'sea-breeze', as air flows inland from the cool water surface to displace the warm westerly current. This refreshing east wind is more commonly experienced along the shore than in the interior of the city or the western suburbs. In winter, under appropriate conditions, the severity of cold waves is reduced by the nearness of the then relatively warm water. The average date of the last occurrence of freezing temperature in spring is April 8; the latest is May 3, 1874 and 1882. The average date of the first occurrence of freezing temperature in autumn is November 7; the earliest on record is October 5, 1881. In suburban areas, especially away from the coast, these dates are later in spring and earlier in autumn by up to one month in the more susceptible localities.

"Boston has no dry season. For most years the longest run of days with no measurable precipitation does not extend much more than two weeks. This may occur at any time of year. Most growing seasons have several shorter dry spells during which irrigation for high-value crops may be useful.

"Much of the rainfall from June to September comes from showers and thunderstorms. During the rest of the year, low pressure systems pass more or less regularly and

produce precipitation on an average of roughly one day in three. Coastal storms, or 'northeasters', are prolific producers of rain and snow. The main snow season extends from December through March. The average number of days with four inches or more of snowfall is four per season, and days with seven inches or more come about twice per season. Periods when the ground is bare or nearly bare of snow may occur at any time in the winter.

"Relative humidity has been known to fall as low as 5% (May 10, 1962), but such desert dryness is very rare. Heavy fog occurs on an average of about two days per month with its prevalence increasing eastward from the interior of Boston Bay to the open waters beyond.

"The greatest number of hours of sunshine recorded in any month was 390, or 86% of possible, in June 1912, while the least was 81 hours, or 28%, in December 1906.

"Although winds of 32 m.p.h. or higher may be expected on at least one day in every month of the year, gales are both more common and more severe in winter."

Surficial Hydrology

As an urban site, the Park Plaza environment contains minimal surface water feature. The Swan Boat Pond in the Public Garden is probably the most significant surface water resource that will be directly impacted by the project. Even this water body, however, is artificially sustained. The pond can be, and is, periodically drained.

Other surface waters indirectly impacted by the project include the remote reservoirs developed to maintain the City's water supply; the Charles River Basin, which has traditionally been utilized as a surcharge pool for storm water and sanitary sewage overflows; and the Boston Harbor in the vicinity of the Deer Island waste water treatment facility which discharges into the Presidential Channel.

As in any urban area, most surface water received by storms is quickly dissipated into artificial sewer systems which essentially replace the historic natural surface water elements that once characterized the site. This acceleration of natural run-off flow rates is essentially adverse but temporary.

Subsurface Hydrology

The subsurface hydrology of the Park Plaza environment is a significant element. Since the project site is situated on the site of the historic shoreline between the Shawmut Peninsula and the Charles River tidal flats, excavation for the project is certain to impact the ground water regimen of the Back Bay community, which is constructed on the filled marshes of the Charles River.

The relatively complex soil conditions described above naturally promote an equally complex groundwater regimen which is in turn rendered more complicated by human activities. Thus, the regimen is described, but little data are available on actual groundwater levels.

The most familiar groundwater condition and probably the most important for practical purposes is that which exists in the fill west of Carver Street. Historically the groundwater level in the fill in the Back Bay has been of the order of Elevation +7 to +8 (Boston City Base) which is slightly above mean sea level and which is approximately the level at which the Charles River Basin is maintained. However, this groundwater level is influenced locally by such factors as leaking sewers and water mains, building sumps and subway drains. In fact the U.S. Geological Survey, Ground-

water Branch has concluded (informal communication) that groundwater levels in Boston are influenced far more by man-made construction than by natural factors.

Some data are available on water levels in the fill in the Park Plaza area. Observation wells installed in 1972 indicated water levels ranging from Elevation +2 to +8 in the winter and early spring of that year. The mean water level in the northern portion of the area along Boylston Street was about Elevation +6. In the southern portion of the area the mean water levels ranged from Elevation +3 to +6.

No study was made at that time of the factors which might be influencing the water levels and it is not known whether any such study has ever been made for this area. One possible factor at the east end of the area is the abondoned Tremont Street subway tunnel. Drawings for this section (dated 1896) show an underdrain below the tunnel at a depth of 30 to 35 feet below ground surface which, if still operable, would substantially depress normal water levels in that area. Another possible positive influence is the Lagoon in the Public Garden which it is understood is maintained at about Elevation +10 through most of the year. The water level is allowed to drop during the winter months and the pond is completely drained for a short period each spring. No record was found of what these lower levels might be.

In the interbedded clay/sand sequence it must be assumed that the granular layers, which are of moderate permeability and which are confined by the essentially impervious clay layers, are water-bearing, but there are no data on what the levels might be. Similarly the bedrock is known to be water bearing to a limited degree. For purposes of this study it has been assumed that levels would be at about Elevation +8 although levels in the rock considerably below sea level have been recorded both at the Prudential Center and in downtown Boston. The glacial till is usually relatively impervious although local pockets or zones of waterbearing pervious sands and gravels are sometimes encountered.

Vegetative Resources

As an urban site, the general environment of Park Plaza has little, if any, natural vegetation. Although the project site is directly adjacent to the Boston Common and Public Garden, the vegetation in these two unique and historic open spaces represents an artificial, managed environment which has long been subjected to various development impacts, and accordingly has a complex and well-developed tolerance to withstand developmental activity.

As a managed environmental resource, the vegetation of the Boston Common and Public Garden has traditionally been an item of major public concern.

Boston Common is the first public open space used for urban recreation in America. The forty-five acres lie between Beacon, Park, Tremont, Boylston, and Charles Streets. The Public Garden, adjacent to the Common, consists of approximately twenty-six acres. It is built over one-time marshes of the Charles River, and is fairly considered one of the most precious urban open spaces in the New World.

About 15 kinds of trees grow within the 50 acres of the Boston Common. Elm and linden trees are predominant, but there are also many examples of maples, oaks, and cherry trees. The species present include:

American Elm
Beech
Cherry
Laburnum
Linden
Maidenhair
Elm (Ulmus Procera, Glabra, Thomasi)
Holland Elm
Honey Locust
Oak
Sugar Maple
Yellowwood
Maple (Acer Platanoides, Pseudoplatanus, Schwedleri, Saccharinum)

The condition of the plant materials varies across the Common. The structure of the subsoil on the northern side increases the effects of drought. The areas most heavily used are also the areas in which growing conditions are worst. Compaction of the soil near the Park Street subway and the Soldiers and Sailors Monument, for example, has aggravated the condition of trees in those areas. The trees bordering Charles Street, including the recently planted maples and maidenhair trees, are having difficulty surviving due to the condition of

the soil and the proximity of the roadway.

The plant materials in the Common also suffer from poor or inadequate maintenance. The Carol R. Johnson Associates' report notes that nearly 40 percent of the 730 trees in the Common are in poor condition while 6 percent have died.

A Master Plan for rehabilitation based on the guidelines and policies already developed in conjunction with the previously noted Carol R. Johnson Associates' report is currently being implemented. The Master Plan has established specific design recommendations for a series of separate rehabilitation projects which will, upon completion, present a complete, harmonious restoration of the Common and Garden. Considerable money has been spent in the past on improvements; however, these were not based upon an acceptable Master Plan. The results of these past improvements has been less than what would be desired.

Eighty different kinds of trees grow in the 24 acres of the Public Garden. Although elm trees predominate, there are also numerous examples of beeches, crabapple and cherry trees, and willows around the Lagoon. Certain specimens of trees are rare in the United States, such as the large Japanese Pagoda tree near the corner of Beacon Street and Arlington Street. Seasonal flowers are planted and cared for by the gardeners from the city greenhouse.

The condition of the plant materials varies from one part of the Garden to another. On the northern side, the poor subsoil has hampered growth and increased the effects of drought. All the plants suffer from the effects of poor or inadequate maintenance, such as insufficient watering, lack of essential chemical elements, and lack of soil aeration.

The Carol R. Johnson Associates' report on the rehabilitation of the Common and Garden noted the condition of each tree. Approximately 3 percent of the 580 trees in the Garden have died while another 22 percent are in poor condition.

Faunal Resources

The faunal resources of the Park Plaza environment are also highly urbanized and in that aspect present a management impact issue, similar to the concern with the vegetative resources previously described.

While there are natural wildlife faunal species typically found in the urban setting, they are highly tolerant of human activity and the Park Plaza project will not seriously disrupt the ecological requirements of these wildlife resources.

The basic environmental issues of Park Plaza with respect to faunal resources relate to:

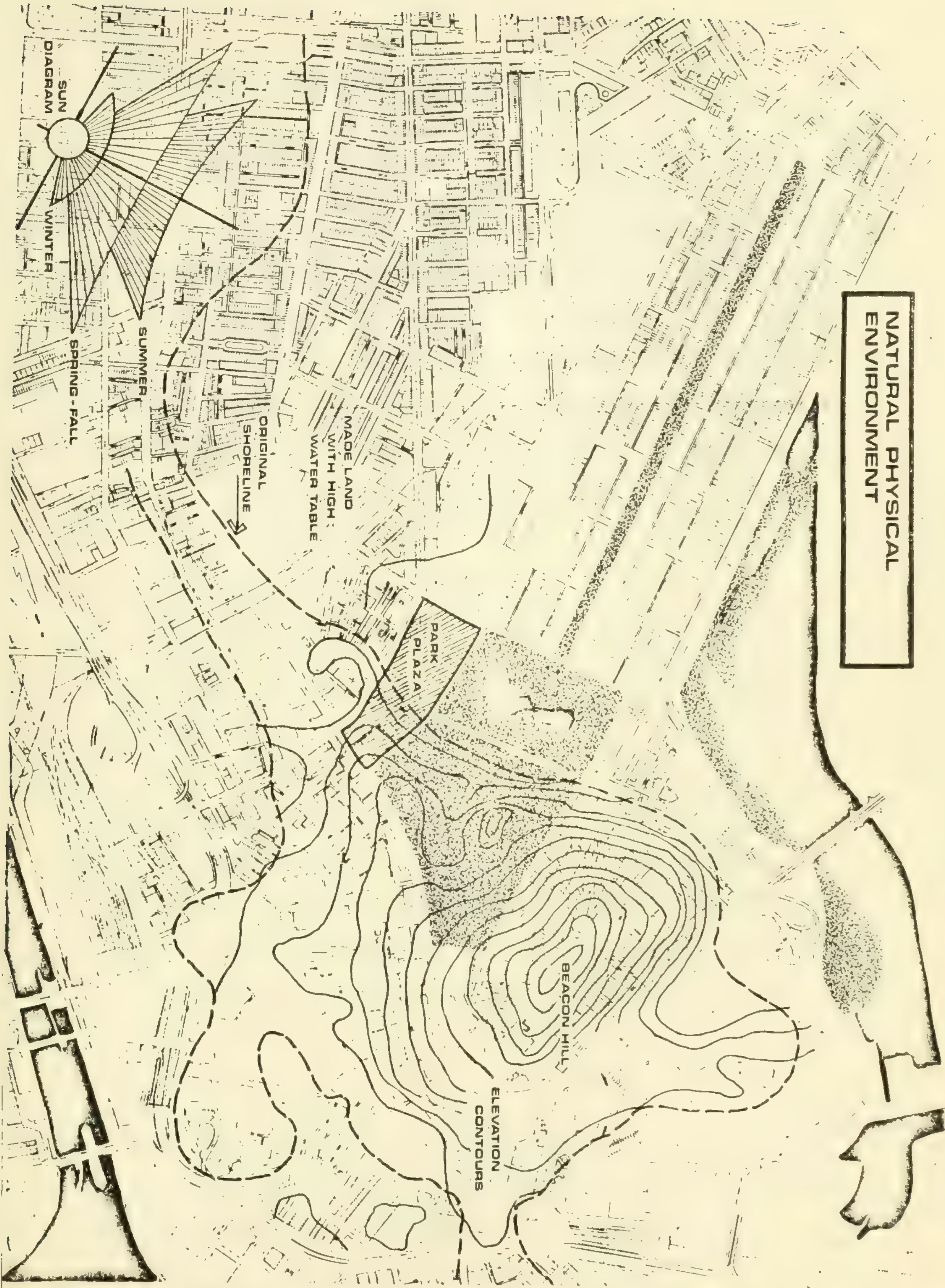
- the control of pest species of insects, rodents and birds.

- the potential impact of additional canine pets on human environmental health and safety conditions in the Boston Common and Public Garden.

While the existing Park Square area contains a great many older structures, the area is not classified as a rodent problem area by the City Health Department. Due to the low

number of residential households in the area, the existing project area does not contribute significantly to the pet population.

There is, however, a growing public concern with the nuisance conditions created by pets in the Common and Garden. An increase in the residential population of the Park Plaza area will probably increase this concern, although the nature of the potential problem is difficult to quantify.



PARK PLAZA BUILDING STUDY STAGE
ENVIRONMENTAL IMPACT ANALYSIS

PREPARED BY
BOSTON REDEVELOPMENT AUTHORITY
CITY HALL
BOSTON, MASSACHUSETTS
THE SARATOGA ASSOCIATES
BRISTOL, LITYNSKI, WOJCIK, TARBOX, HOLLISTER, CINQUINO, AND MOORE PC
THE ARCADE
SARATOGA SPRINGS, NEW YORK
DATE

THE GENERAL BUILT PHYSICAL ENVIRONMENT

Boston is one of the major urban regional centers of the United States. Since World War II, Boston's economy has been characterized by rising personal incomes, increased mobility, leisure time and mass education. In addition to its historic heritage, Boston is a major center for education, science and industry. Boston's built-physical environment has developed in three major steps:

1. Diffused Early Settlement
   The establishment of individual settlements, the pattern based on farm and harbor accessibility and natural protection.

2. Centralization
   The establishment of the core between 1800 and 1850, with the growth of shipping and industry. Radial transportation corridors were established, breaking the constraints of topography of the colonial era.

3. Decentralization
   A "circumferential" pattern developed after World War II, with Route 128 as the initial spine of development.

Boston has thus developed in the classic American trend, including its physical problems and potentials.

A new concern for the built physical environment has accompanied economic growth; the distinctive urban quality of Boston is usually a focus of concern in the context of proposed growth. Briefly, the basic physical attributes of Boston are:

Strong neighborhood land use patterns;
Historic heritage;
Open space resources;
Unique urban quality.

Probably the most prominent characteristics of Boston, especially its downtown setting, are the elements which make up the man-made or built environment. From its early development as a colonial center for trade and commerce, to its place today as one of America's major urban centers, Boston has been subject to, and retained, almost every form of physical development, from colonial-scaled housing patterns to the lineal form of urban expressways and transit lines.

The whole range of built characteristics are evident in and around the Park Plaza site, since the site lies near the center of Boston. The built physical environment can be

summarized as the following elements.

Perceptual Environment

The aspects of the perceptual environment include sound and vibration characteristics, and scenic features or vistas.

With the prominent open spaces of the Boston Common and Garden on one side, and the existence of major transportation corridors on all sides, the Park Plaza area can be characterized as a busy, active area, with as much noise as most urban areas. The general level and quality of sound and vibration on and around the site area is the base setting for changes which would result from excavation and construction activities. These activities are somewhat controllable and are a result of the particular construction strategy rather than the program of the project, in terms of the kinds of equipment used and the phasing of construction operations. Thus, the sound and vibration base setting is deferred until the design testing phase.

In terms of scenic attributes, the Park Plaza site lies at the center of Boston's historic fabric. The most prominent scenic features are probably the Boston Common and Garden, which are not only historic sites, but two of the most prom-

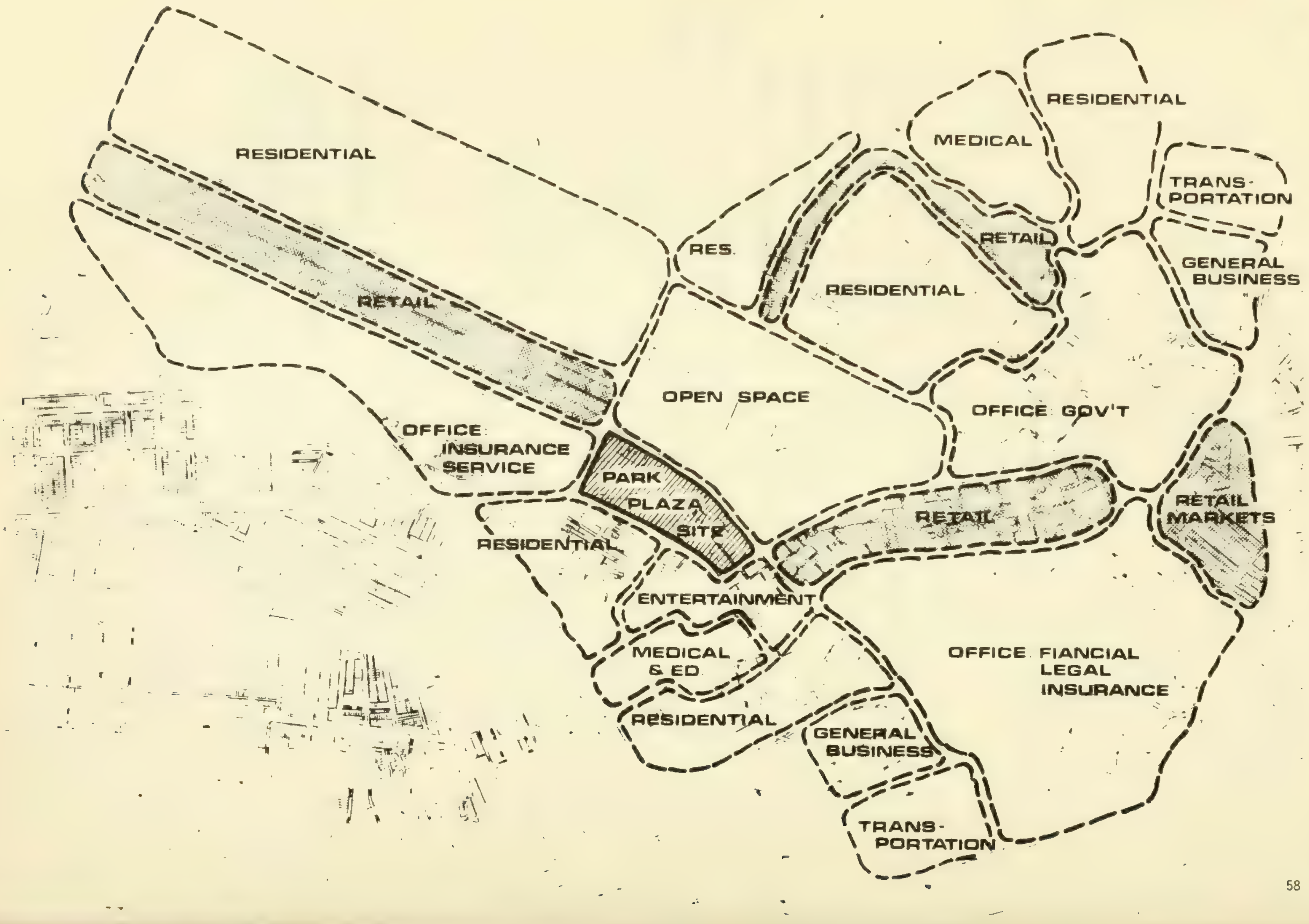
inent open spaces in the nation. These elements are further complimented by a number of other historic sites and a visual backdrop of the Back Bay and Beacon Hill residential areas, both designated as historic districts.

In general, then, the site can be characterized as having a fairly typical urban setting in terms of activity and related noise, but unique in reference to the prominence of scenic aspects.

Land Use

Central Boston is composed of both established districts and areas in constant transition. The Common and Garden, Back Bay, Beacon Hill, Government Center, Chinatown and the office development to the west represent some of the prominent established areas, while the theatre district to the south and the Washington Street "Combat Zone" are areas in transition.

Boston has more housing units in the downtown area than most cities, an important land use aspect in an era when energy resources limit transit and highway capacity.



DOWN-TOWN

FUNC-TIONAL DISTRICTS

PARK PLAZA BUILDING STUDY STAGE ENVIRONMENTAL IMPACT ANALYSIS

PREPARED BY
BOSTON REDEVELOPMENT AUTHORITY
CITY HALL BOSTON, MASSACHUSETTS
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THE ARCADE SARATOGA SPRINGS, NEW YORK
DATE:

Built Character

Built character is made up of structural coverage, height, condition, uniqueness and the related aspects of spatial form, day and night profile (including "skyline") and general and detailed visual character.

Generally, Boston is more of a "low rise" city compared to many urban centers, due mainly to the retention of its colonial fabric. The pattern of buildings and the spatial form created by buildings and open space are "organic" in form, constrained by the topography, and developed over 300 years of settlement. The pedestrian scale and natural pattern is probably Boston's most prominent physical quality. The uniqueness of the Boston downtown environment also derives from the importance of its historic artifacts, sites and buildings which represent a continuous sequence from the mid 1600's to today.

The historic significance and unique quality of Central Boston has its roots in early English settlements during the seventeenth century.

For the first 150 years, until early nineteenth century, Boston's character was that of a colonial harbor town

nestled against the hills of Trimountain, which was located in the general area of Beacon Hill and Boston Common.

King's Chapel Church, The Old State House which was constructed of brick, and Paul Revere's House which was constructed of wood, suggest the architectural character, scale and primitive nature of the buildings and houses of that period. The Unique Quality Map locates those structures which are National Historic Sites.

Early seventeenth century Boston was a part of the Shawmut Peninsula. This hilly peninsula was surrounded almost completely by water except for a narrow strip of land that connected the mainland with the peninsula. A road, now Washington Street, was built over the narrow isthmus of land on which farmers, indians, townspeople and sailors alike entered and left Boston.

As the population increased threefold at the turn of the eighteenth century, Boston expanded its limits by cutting down hills and filling in coves and swamp areas; Beacon Hill is the only area that has retained some of its original character. This was originally part of Trimountain. The construction of Boston followed the example of many cities in terms of tailoring the site to suit man's needs.

The character of Boston continued to change in the early nineteenth century.

- Row houses were common
- Streets were narrow
- The neck of the Shawmut Peninsula was residential in character
- Gridiron streets were superimposed on already existing streets of colonial time. This overlapping of street patterns is one factor giving Boston proper its unique "organic" character.

Beacon Hill was developed in the 1820's with three to four-story brick row houses which became the predominant scale. Later in the middle nineteenth century, Back Bay was developed, mostly with masonry residential structures. South Cove was developed in the 1850's with three to four-story residential structures.

Since the turn of the nineteenth century, development shifted out of central Boston to the west. Residential buildings in South Cove and Back Bay areas began giving way to commercial structures and this has been the trend to the present day.

Despite the growth of Boston and the replacement of old historic development with another, the downtown area has retained some artifacts from every period since the early seventeenth century.

The most obvious problem central Boston faces is how to conserve historic residential neighborhoods by the Beacon Hill, Back Bay and South Cove districts when there is growing economic pressure toward commercial development in these areas. Back Bay residential neighborhoods have given way to institutional properties, condominiums and apartments. South Cove has lost one third of its remaining historic residential areas from 1925 to 1950 alone to commercial pressure and urban renewal.

Areas such as Park Square do not have as strong an image as Beacon Hill or Back Bay districts, thus making it vulnerable to economic forces. Absent are the concentrated elements that are needed to tie a neighborhood together. Such elements as uniform heights and facades, unique cornices and window/door treatments are not consistent throughout the area. There are no on-site parcels or buildings on the National Register. By comparison, areas such as the Beacon Hill, Back Bay areas and unique areas such as the Common and its surrounding physical development add vitality to central Boston.

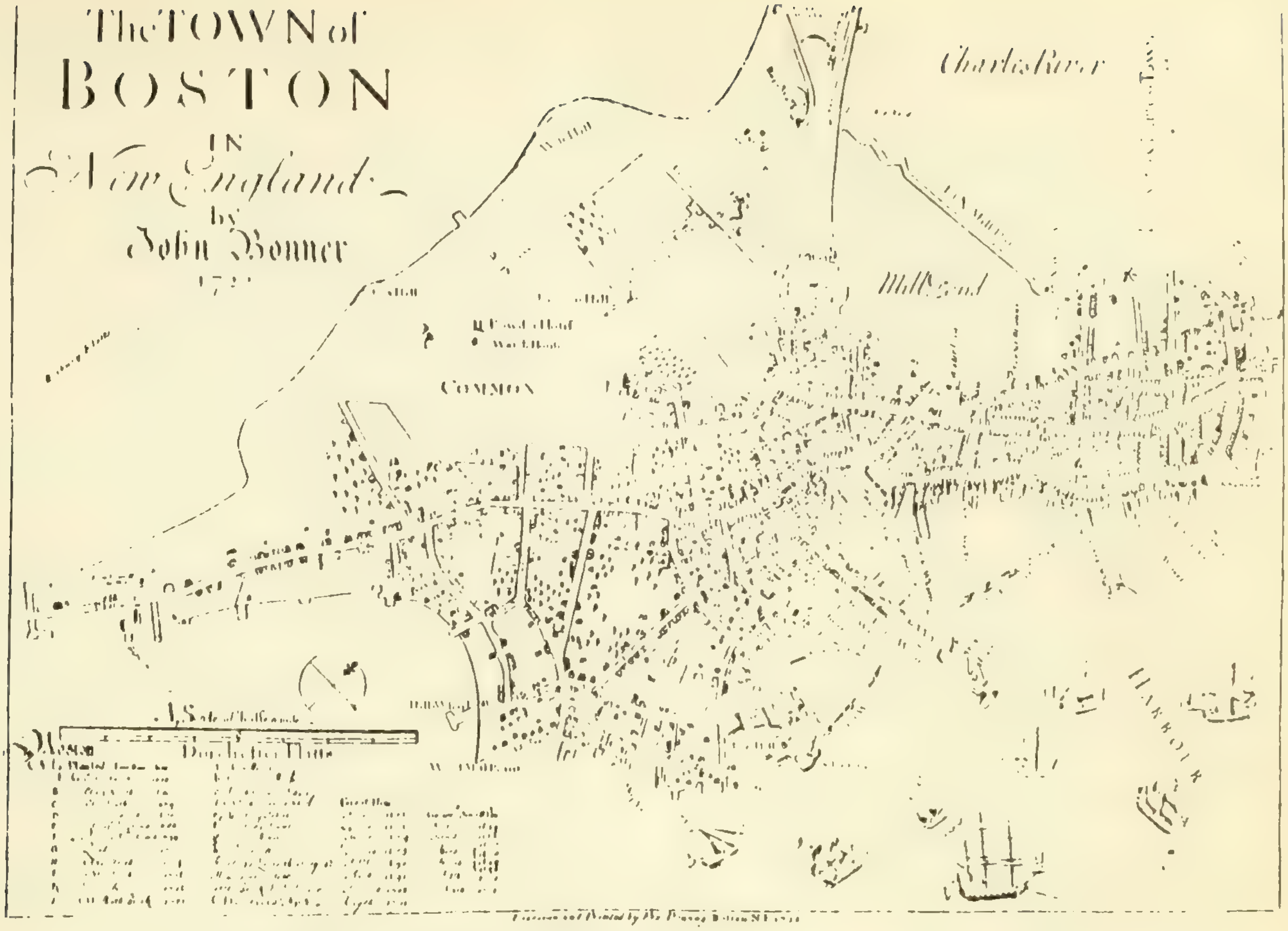
Boston Common was purchased by the City from Reverend Wm. Blaxton in 1634. At that time, it lay on the outskirts of the City, but by 1722 it had become an important area for pasturing cattle, training military companies, and hanging the unwelcome. In 1674 the Englishman John Josselyn described this area as "...a small, but pleasant Common where the Gallants a little before Sun-set walk their Marmalet-Madams, as we do in Morefields, & till the nine a clock bell rings them home to their respective habitation, when presently the Constables walk their rounds to see good orders kept, and to take up loose people."

Early maps, such as the Bonner map of 1769, show few trees along "The Mall" on Common Street (Tremont Street), the original woods having long ago been cleared by Indians and used to heat the homes of the colonists. In 1774 there were approximately 16,000 people in Boston, giving a ratio of 2.8 acres of Common per 1,000 people. After the Revolutionary War the Common was given some landscape attention by the addition of a new line of trees along The Mall in 1784. Still, grazing cattle and cart loads of hay en route to the hay scales gave a bucolic atmosphere to the area.

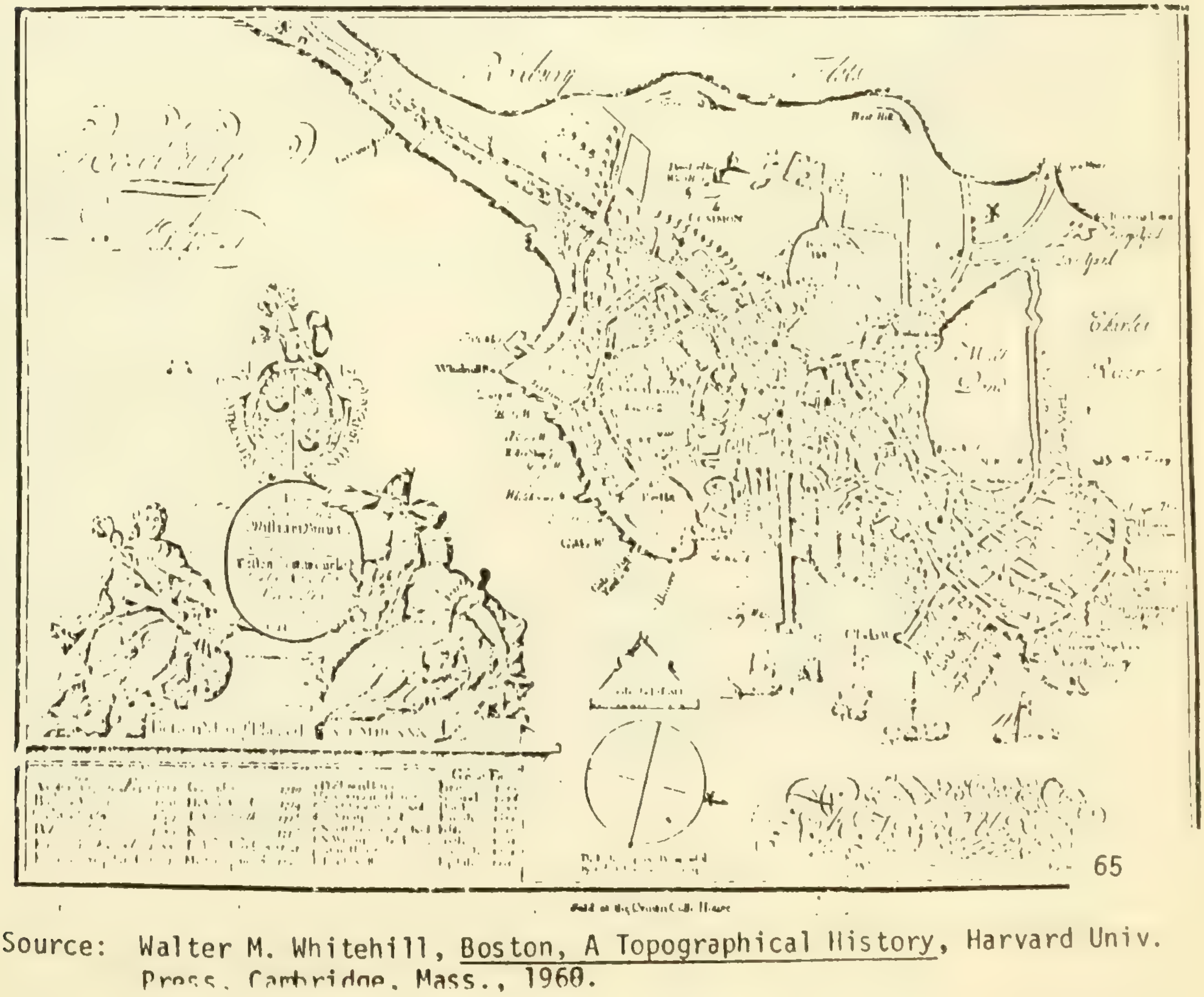
The J.G. Hales map of 1814 shows trees around most of the Common, including a single row along Beacon Street, a double

row along Park Street, and a triple row along much of The Mall. An additional row of trees is indicated in the interior of the Common, running from West Street to the intersection of Boylston and Charles Streets. The City Census of 1825 showed a population of more than 58,000, or a total of .8 acres of Common for each 1,000 people.

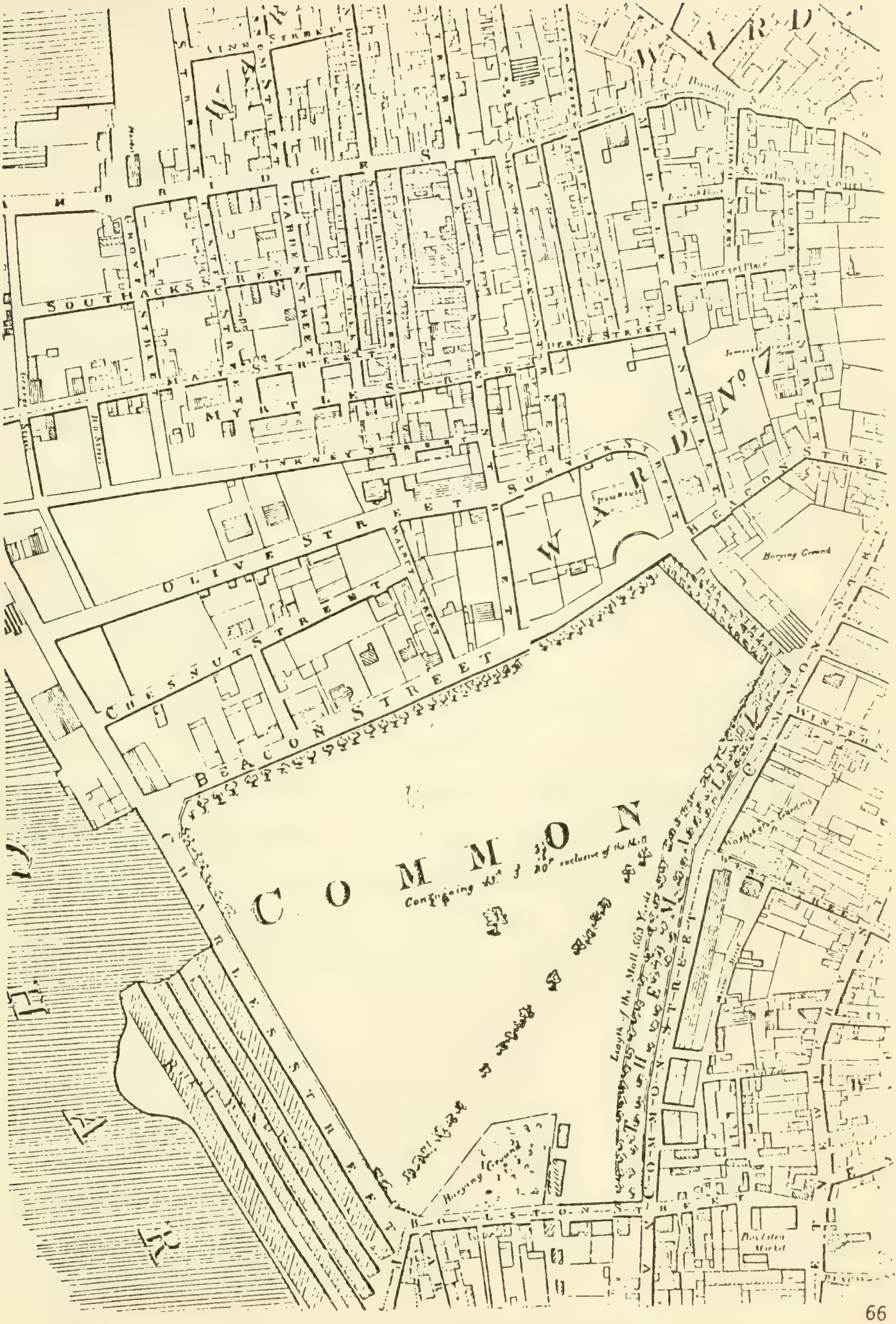
The marshy flats at the foot of the Common seemed a remote area in 1794 and a portion of the area was given to rope makers for the erection of their long buildings, known as ropewalks, which are indicated on the Hales Map of 1814 (on the present site of the Southeast corner of the Public Garden). Thirty years later, in 1824, the no longer remote site was purchased by the City for $55,000 (almost $1.00 per resident!). The future of the site was settled at a general meeting of the citizens. Alternatives included making it a cemetery, dividing the area into house lots and streets, and annexing it to the Boston Common. Mayor Josiah Quincy's proposal that the area be annexed to the Common and "forever after kept open and free of buildings of any kind, for the use of the citizens" was overwhelmingly approved by the public assembly. This brought the combined acreage of the Common and Garden to approximately 71 acres, or 1.2 acres per thousand residents. Still, proposals for other uses continued, and did not finally go down to defeat until the 1850's. Meanwhile, the use of the site as a botanical garden on the model of European cities began to develop. In 1837 Horrace



1722 and 1728 MAPS OF BOSTON



Source: Walter M. Whitehill, Boston, A Topographical History, Harvard Univ. Press, Cambridge, Mass., 1960.



DETAIL FROM J. G. HALES MAP OF 1814

Source: Walter M. Whitehill. Boston, A Topographical History, Harvard Univ. Press, Cambridge, Mass., 1960.

Gray and other amateur horticulturists petitioned the city to use the land for such a garden. By an act of the Legislature in 1839 he and George Darracott, Charles P. Curts, and others, were incorporated as the Proprietors of the Botanic Gardens in Boston. The groups built a greenhouse and set out numerous ornamental trees.

In 1859 the Legislature assured the future of the Public Garden by providing that no building save a City Hall might thereafter be erected between Charles and Arlington Streets. By the 1860's the Public Garden and the Boston Common had their basic form as it exists today.

Most of the larger trees in both the Common and the Garden date from the middle of the nineteenth century or, in the case of the Common, some of the trees probably date from the 1784 and prior plantings. Most of these early tree plantings were elms and some truly magnificent specimens remain. Several elms with a caliper in excess of 40 inches and a height of more than eighty feet are notable.

In 1929 the Park Department did a major new planting, primarily of Lindens, in the Common. Other plantings of trees have occurred at various points in time but it is convenient to discuss the major tree plantings as those prior to 1860

and the more recent 1929 planting. It is interesting to note that the 1860's drawing of the Public Garden includes a number of small pines or evergreens, none of which exist today, probably because of their low tolerance for airborne pollutants.

CIRCULATION

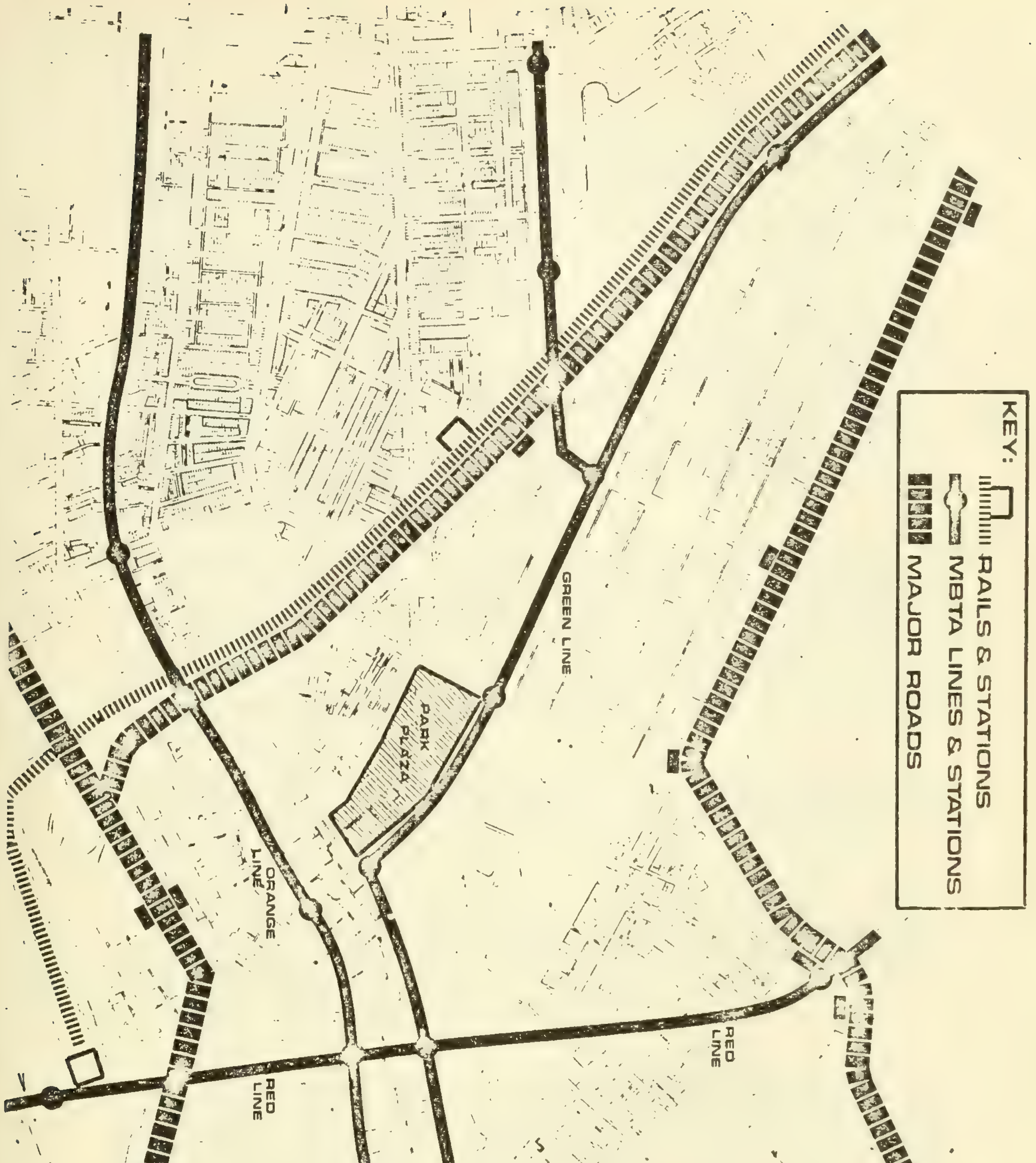
The general environment of the Park Plaza project is conveniently served by a variety of circulation facilities:

- Expressways
- Local Streets
- Rail Transit
- Commuter Rail
- Local and Commuter Bus
- Walking

The site is directly served by the M.B.T.A. Green, Orange, and Red Lines with six stations in the nearby vicinity: Arlington, Boylston, Essex, Park Street, South Cove, and Back Bay, the latter two being new Orange Line stations. In addition, the site is within one quarter mile walking distance of Penn Central commuter rail service and of commuter bus service. Direct subway connections are possible with both the Blue Line and with Boston and Maine commuter rail service at North Station; for example, rail commuters from the north can use either the Orange Line or the Green Line to travel to Park Plaza. The site area presently is served directly by two local M.B.T.A. bus routes and is approximately one third mile from the planned new South Station transportation terminal.

Because of the site's location relative to the Back Bay, Beacon Hill and South Cove residential areas and to the commercial center of downtown Boston, walking will be convenient from each of these areas to Park Plaza. It can be expected, therefore, that a higher than normal percentage of both home-to-work and visitor trips to Park Plaza would be pedestrians.

With respect to expressway and automobile access, Park Plaza is centered among the five major facilities serving the downtown area: the Massachusetts Turnpike, Storrow Drive, Interstate 93/Mystic River Bridge, the Sumner/Callahan Tunnels, and the Southeast Expressway (refer to Transportation Access Routes map, next page). The majority of Park Plaza bound automobile trips from outside the city will enter the cordon on one of these routes.



PARK PLAZA BUILDING STUDY STAGE
ENVIRONMENTAL IMPACT ANALYSIS
PREPARED BY:
BOSTON REDEVELOPMENT AUTHORITY
CITY HALL BOSTON, MASSACHUSETTS
THE SARATOGA ASSOCIATES
BRISTOL, LITYNSKI, WOJCIK, TARBOX, HOLLISTER, CINQUINO, AND MOORE PC
THE ARCADE SARATOGA SPRINGS, NEW YORK
DATE:

DOWN-TOWN
TRANSP ACESS ROUTES

UTILITIES-Private

Included within the general private utilities environmental base are these power, communications, and fuel systems:

- electric
- steam
- gas
- telephone

Electricity - to the Park Plaza Project area is presently supplied from sub-stations which are fed from the Boston Edison Co. 115 KV transmission system. The two sub-stations feeding the area today are the Belvidere Street Station and the Carver Street Station. In the future the area will be fed mainly by the Kingston Street Station which is under reconstruction.

These sub-stations are fed by power generated at the New Boston Generating Station in South Boston which is the closest station and by the Mystic Station in Everett, the Edgar Station in Weymouth and the Pilgrim Station in Plymouth. The South Boston, Everett and Weymouth Stations feed directly into 115 KV transmission system while the Plymouth Station feeds via a 345 KV system which is transformed to 115 KV in the southern part of the state at stations in Holbrook, Walpole and Medway.

The 115 KV and 345 KV systems are interconnected to systems in Massachusetts and all the states contiguous to Massachusetts and at any instant of time power can be supplied from any of the station in the grid.

The prime source of fuel is oil with nuclear power second. The New Boston Generating plant in South Boston, the Mystic Station in Everett and the Edgar Station in Weymouth burn oil while the Pilgrim Station in Plymouth is nuclear. The sources of power from grid interconnections are coal, oil, and neuclear.

Steam - to the Park Plaza Project area is fed through the district system. The steam is generated at the Kneeland Street Station near South Station, the Minot Street Station near the North Station, the Scotia Street Station near the Prudential Center and the "L" Street Station in South Boston. The closest supply to Park Plaza is the Kneeland Street Station. The prime source of fuel is No. 6 (heavy) oil except that Kneeland Street can burn natural gas a few months of the year in the off peak season for the Boston Gas Co.

Gas - in supplied to the Park Plaza area by the Boston Gas Co. through three places, the Everett Plant, the Commercial Point Plant in Dorchester and the Wellesley Meter Station. During the summer months the Algonquin Gas Transmission Co. supplies the Boston Gas

Co. with natural gas which is piped into the Boston area from the southwest. This gas is partly used to supply their customers and partly used to fill their storage tanks. During the winter which is their peak season they use the gas stored in the tanks as well as the gas being piped in to supply their customers. Boston Gas Co. also supplements their supply by bringing liquified natural gas by ship from Algeria and by manufacturing synthetic natural gas at their Everett Plant from propane.

The New England Telephone and Telegraph Co. serves the Park Plaza Project area at the present time through their Back Bay Exchange and their Harrison Avenue Exchange. In the future when the Park Plaza Project is constructed they plan to transfer the entire area over to the Harrison Avenue Exchange.

UTILITIES - Public

Included within the general public utilities environment base are these systems:

- potable water supply
- high pressure fire
- sanitary sewer and treatment
- storm water sewer and treatment

The locations of these systems which service the project area and a description of the conditions of these systems are described below.

POTABLE WATER SUPPLY SYSTEM

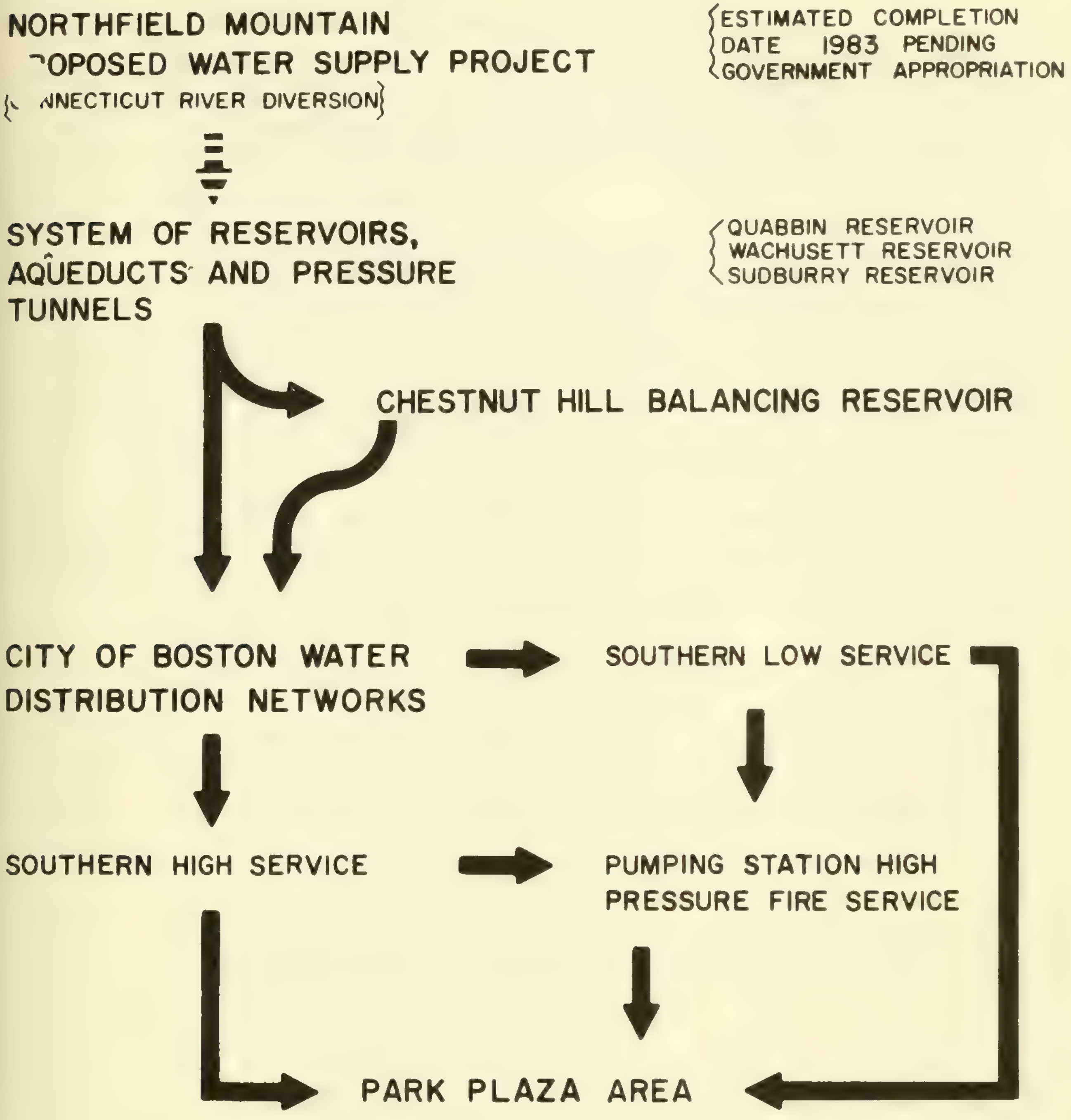
Exhibit 2-1 on the following page is a schematic representation of the water transmission and distribution systems that service and supply potable water to the Park Plaza area. The schematic suggests that the logical examination of the water transmission and distribution system is from the regional view down to the specific site area.

. Regional Supply and Distribution Systems

The regional control for potable water supply and transmission is under the Metropolitan District Commission's Water Division. The responsibility of the Water Division is to provide an adequate potable water supply to the member communities of the Metropolitan Water District. In addition, the Water Division, in cooperation with other agencies, is responsible for planning and developing new sources of water to meet projected demands of member communities.

The existing sources of supply for the MDC are the Quabbin Reservoir in the Swift and Ware River Watershed, the Wachusett Reservoir in the Stillwater and Nashua River Watershed, and the Sudburry Reservoir. The maximum dependable safe yield from these sources is 300 million gallons per day as stated in a water study report conducted by the New England Division Corps of Engineers in October, 1974. Previous reports had estimated available sources at 330 million gallons per day. However, the Corps of Engineer's study reduced the figure by 30 million gallons per day based on the evaluation of these facilities under severe drought conditions.

As of this date (1975) the MDC regional system is operating at 330 million gallons per day (MGD). The present operating capacity is, therefore, 30 MGD above the dependable safe yield.


NORTHFIELD MOUNTAIN
OPOSED WATER SUPPLY PROJECT
NNECTICUT RIVER DIVERSION
ESTIMATED COMPLETION DATE 1983 PENDING GOVERNMENT APPROPRIATION
SYSTEM OF RESERVOIRS, AQUEDUCTS AND PRESSURE TUNNELS
QUABBIN RESERVOIR
WACHUSETT RESERVOIR
SUDBURRY RESERVOIR
CHESTNUT HILL BALANCING RESERVOIR
CITY OF BOSTON WATER DISTRIBUTION NETWORKS
SOUTHERN LOW SERVICE
SOUTHERN HIGH SERVICE
PUMPING STATION HIGH PRESSURE FIRE SERVICE
PARK PLAZA AREA

MAIN
Engineers

PROPOSED PARK PLAZA DEVELOPMENT AREA

WATER TRANSMISSION, DISTRIBUTION SYSTEM

MAY 1975 EXHIBIT 2-1

. City of Boston Supply and Distribution Systems

The City of Boston is the largest water user in the Metropolitan District System. In 1974, the city demanded approximately 52,925 billion gallons of water. This annual rate yields an average daily demand of approximately 145 MGD. For the case of 300 MGD dependable safe yield, the City of Boston demand is approximately 48 percent of the total.

The City of Boston water supply is received at 24 metered junctions at the interfaces between the city network and the MDC lines. Most of these connections are from MDC lines that only extend to the city limits. At this point, the City of Boston trunk mains convey the water into the distribution network. The exceptions are two MDC lines that convey water to the Boston system within the city limits. These two MDC lines, the 26 inch main along Morton Street and the 24 inch main along Hyde Park Avenue, supply the southern high service distribution system in Dorchester and Hyde Park, respectively. These lines remain in use as they have been joined by the new Dorchester Tunnel serving the same district.

The City of Boston distribution system has four independent main networks. The networks, with approximate maximum static water levels, are listed below:

A. Service to the City of Boston and Boston Proper;

1.	Southern Low Service	170 feet
2.	Southern High Service	260 feet

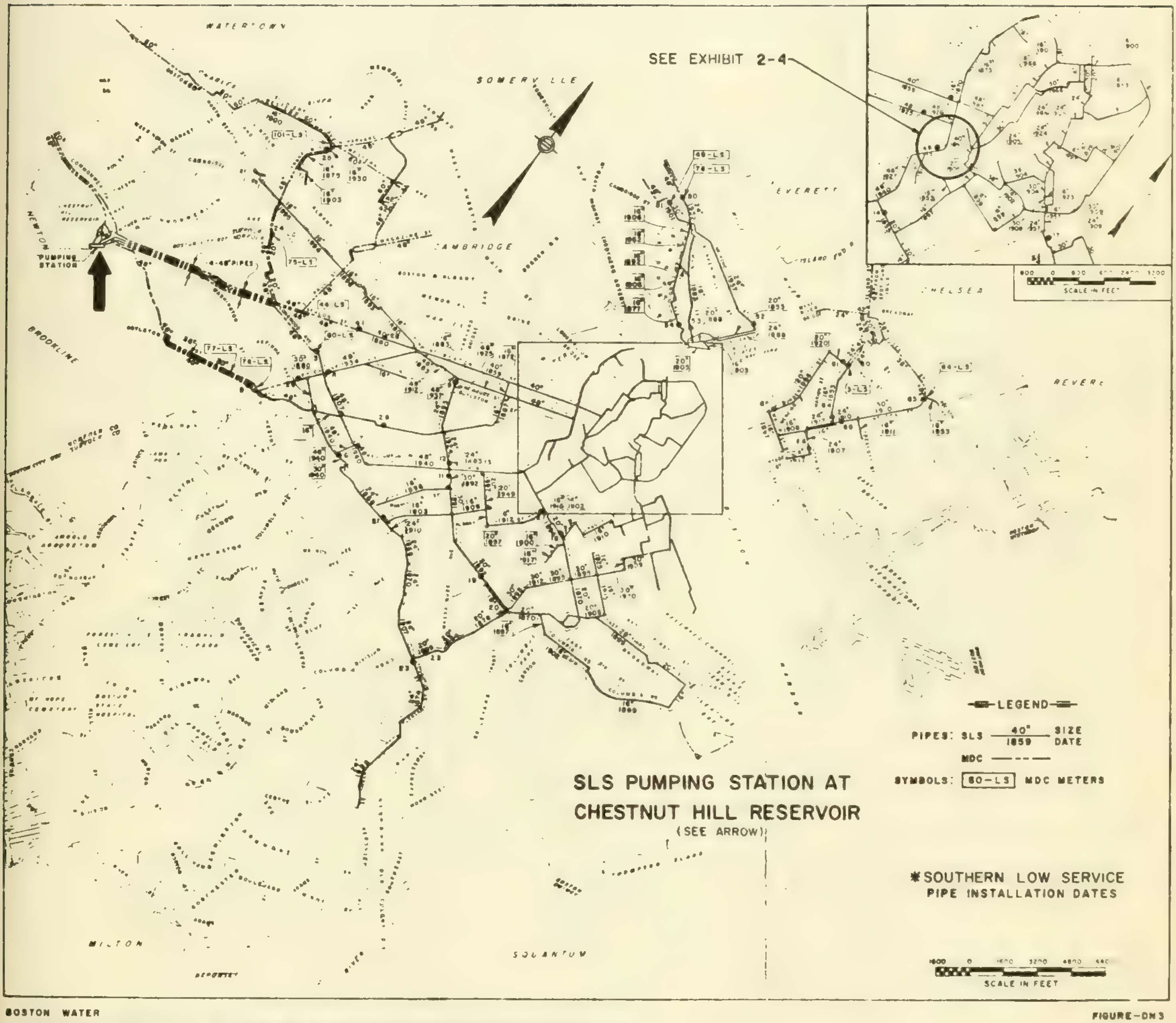
B. Service to the City of Boston excluding Boston Proper;

1.	Northern Low Service	160 feet
2.	Southern Extra High Service	395 feet

From all the MDC water supplied to the Metropolitan area, only the southern low service and southern high service individually and collectively supply Boston Proper.

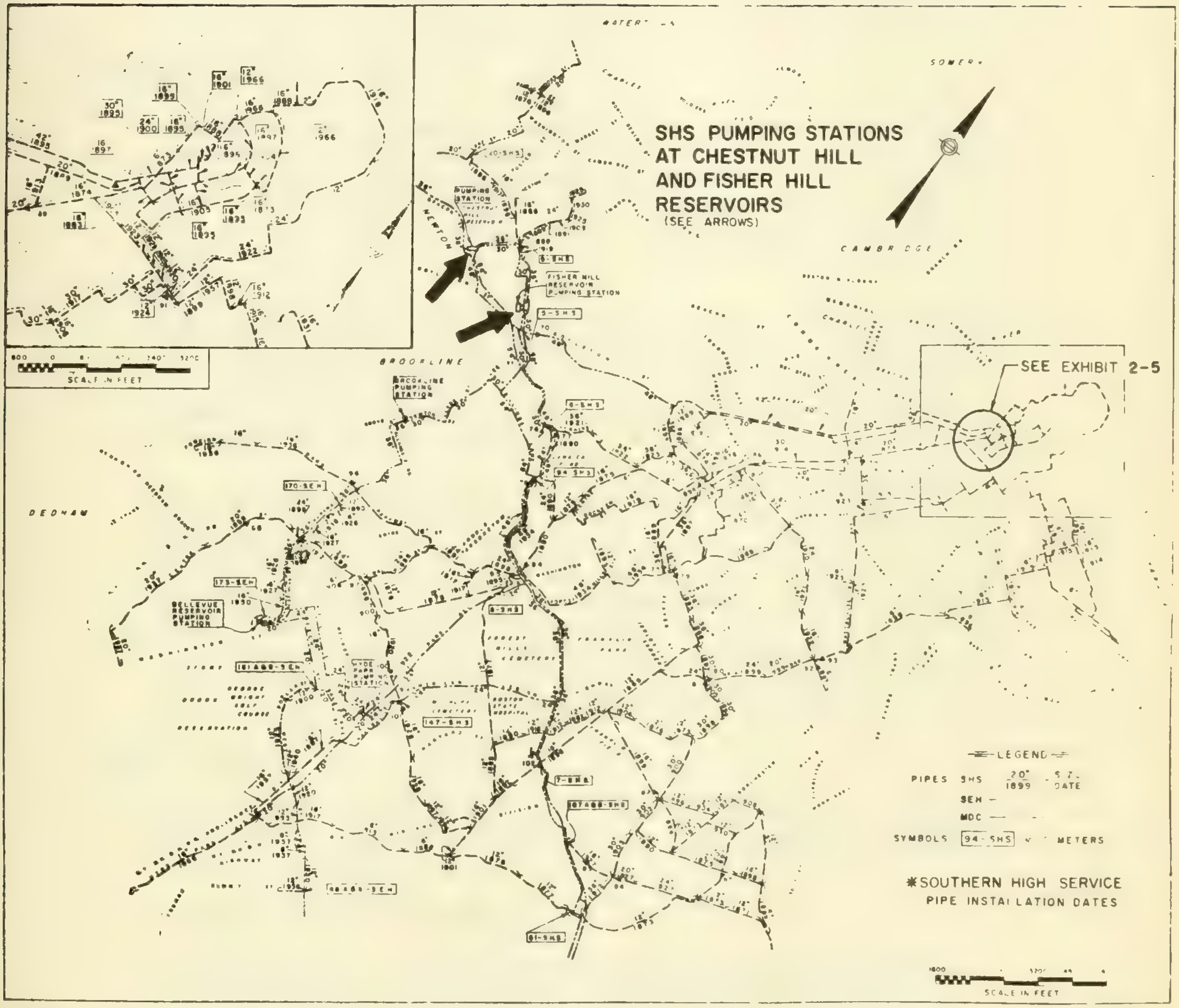
. Southern Low Service

The southern low service (SLS) system is shown in Exhibit 2-2. (on the following page). The SLS is a subdivision of the main low service system. The SLS supplies water to about one-third of the city area south of the Charles River. As such, the SLS is a source of water supply to the Park Plaza area. Additionally, the SLS is the primary water supply to the High Pressure Fire System.



*EXCERPT FROM CITY OF BOSTON WATER DISTRIBUTION SYSTEM REPORT
FIGURE-DN3, SEPTEMBER 1967

EXHIBIT 2-2



BOSTON WATER

FIGURE-DN4

*EXCERPT FROM CITY OF BOSTON WATER DISTRIBUTION SYSTEM REPORT
FIGURE-DN4, SEPTEMBER 1967

EXHIBIT 2-3

. Southern High Service

The southern high service (SHS) is shown in Exhibit 2-3. The SHS supplies a large area of the city south of the Charles River. Approximately 45 percent of the total Boston demand is served by the southern high service network. With extensions of high service mains into low service areas, the high service furnishes domestic water to the large number of buildings reaching elevations higher than 100 feet. Also, the SHS supplies sprinkler systems and standpipes in many buildings in the congested high value district. The SHS additionally provides the emergency water supply to the High Pressure Fire System.

HIGH PRESSURE FIRE SYSTEM

In addition to the several services which distribute the normal water demands within the city, there is a separate system specifically established to provide fire protection in the congested high-value district of the city. This system is known as the High Pressure Fire System (HPFS). Exhibit 2-6 is a plan view of the HPFS.

The system, which was established early in the twentieth century, consists of a pumping station at Kneeland Street, a pumping station at Atlantic Avenue, and approximately nineteen miles of unlined cast iron pipe. The water supply for the HPFS is from the SHS and the SLS. The SLS serves as the primary water supply while the SHS provides the emergency back-up.

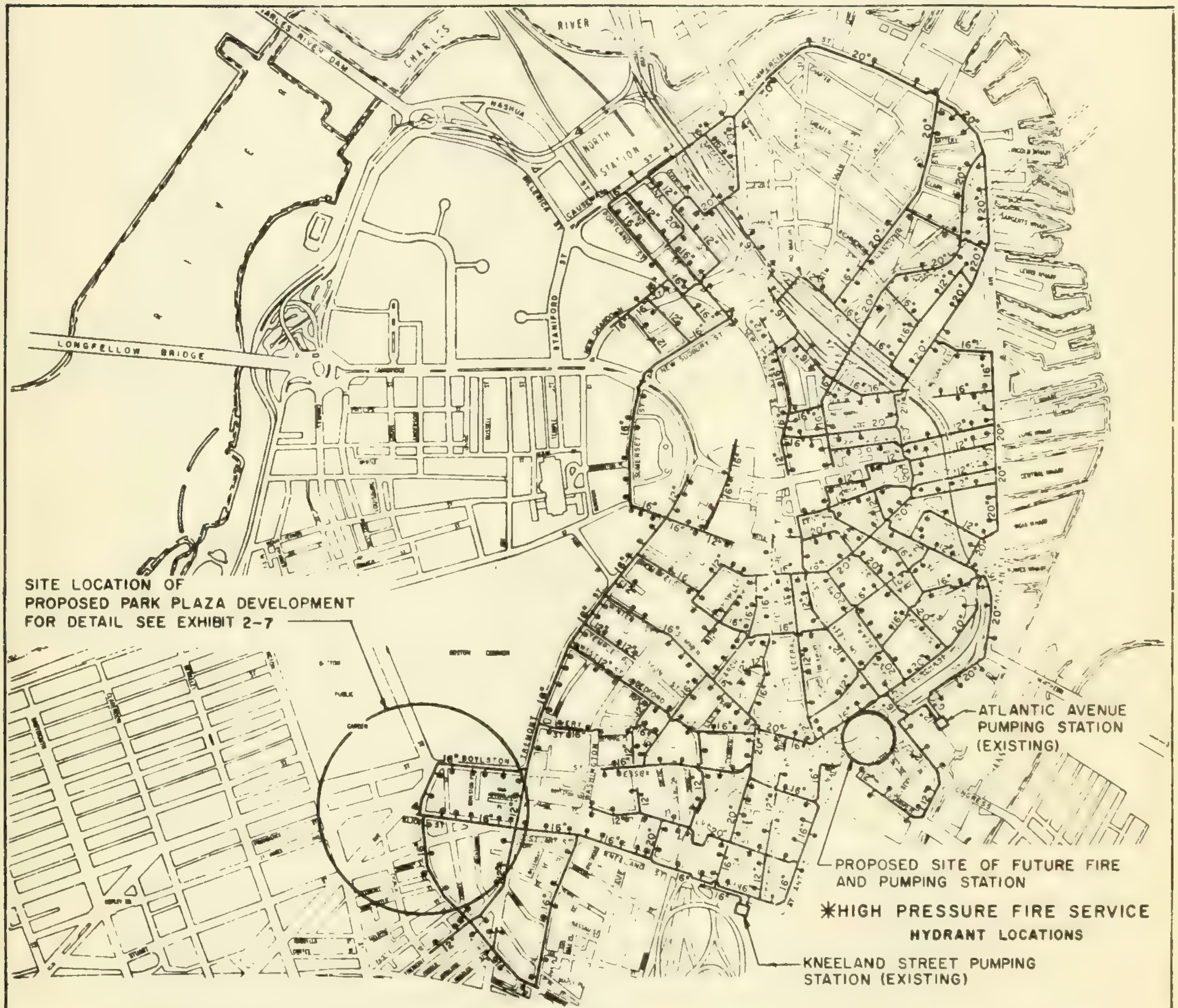
The Kneeland Street Station is the primary source of water pressure for the HPFS. Adjacent to the Kneeland Station is a Boston Edison Steam Electric Station which supplies the steam necessary to operate the two pressurizing pumps at the station. The Atlantic Avenue Station, containing two electric powered pumps, serves as back-up to the Kneeland Station. Further, the Atlantic Avenue Station has been set-up to draw water directly from the harbor in case of major fire. However, the connecting pipe was removed during the Second World War for security reasons and has not been replaced.

SEWER SYSTEMS

The relationship of the Park Plaza sewer systems to the Metropolitan Sewer Systems is shown schematically in Exhibit 2-8 and in plan view in Exhibit 2-9.

. Metropolitan Sewer System

At present there are three sewage systems servicing the Boston Metropolitan Area. Local sewers discharge to the Boston Main Drainage System, the South Metropolitan System, or the North Metropolitan System. The systems have outlets to Boston Harbor from Moon Island, Nut Island and Deer Island. The sewers servicing the proposed Park Plaza area are intercepted by the Boston Main Drainage System.



BOSTON WATER

FIGURE—HPFS I

*EXCERPT FROM REPORT ON "CITY OF BOSTON WATER DISTRIBUTION SYSTEM", FIGURE HPFS-1, PAGE 121, SEPTEMBER 1967

EXHIBIT 2-6

. Boston Main Drainage System

The principal components of the Main Drainage System are the Boston Main Interceptor, five branch interceptors, and outlet facilities. The five branch interceptors are the East Side Interceptor, the West Side Interceptor, South Boston Interceptor, Dorchester Interceptor and the Stony Brook Interceptor. The proposed Park Plaza Development site sewer systems drain to the West Side Interceptor. (See Exhibit 2-10).

The estimated 600 acres served by the West Side Interceptor are located generally on the northwest side of the Boston Peninsula. This area includes the Park Plaza area and much of the Back Bay area. Overflows from the West Side Interceptor are discharged to the MDC Boston Marginal Conduit. Since 1967, the West Side and Stony Brook Interceptors have been diverted to the North Metropolitan System through the Boston main drainage relief sewer.

. North Metropolitan Sewage System

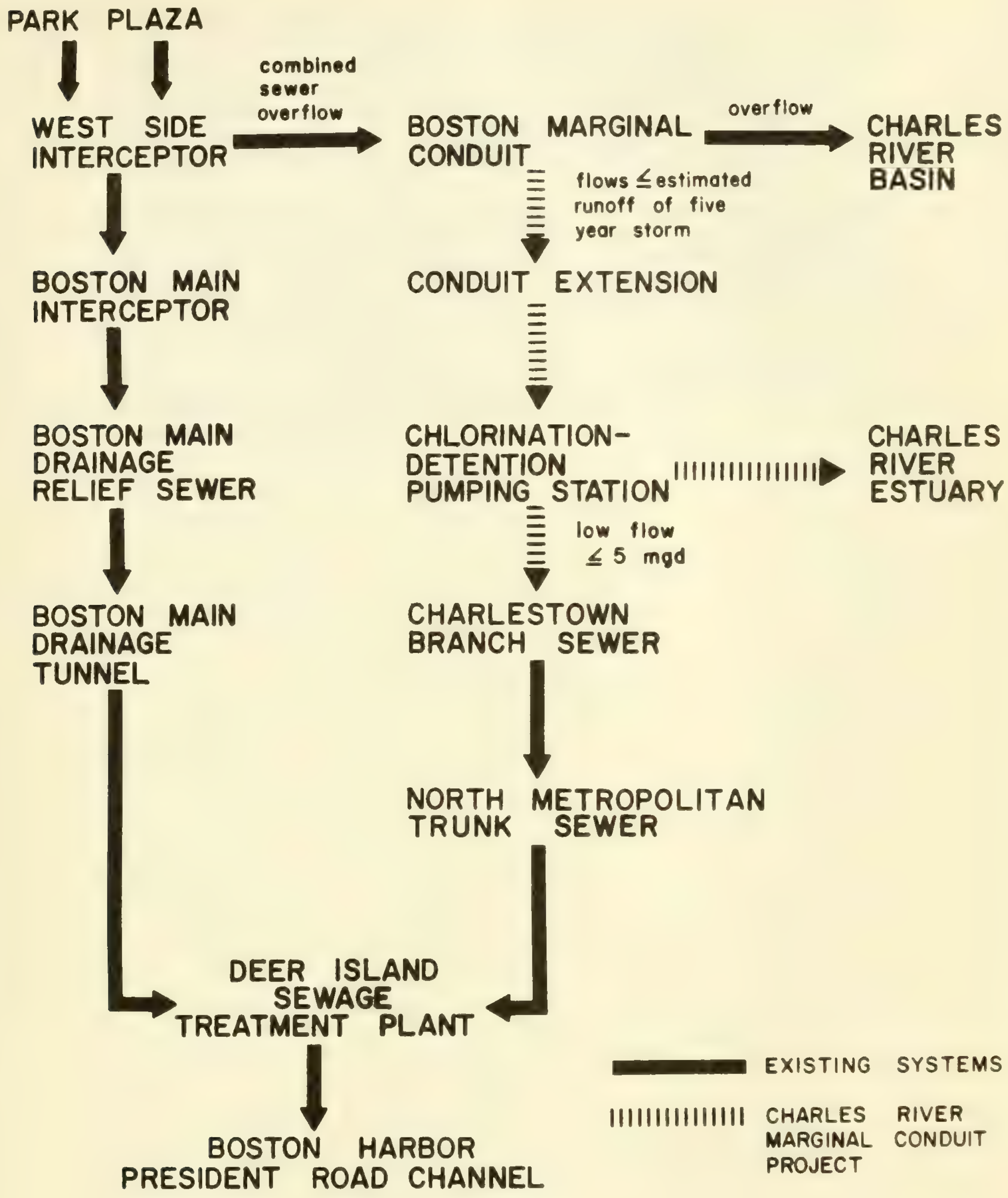
All sewage from the North Metropolitan Sewage System flows to the Deer Island Sewage Treatment Plant. Presently the Northern system is divided into two districts: (1) the Charlestown and East Boston District; and, (2) Boston Main Drainage District. The Charlestown and East Boston District is served by the North Metropolitan Trunk Sewer and the North Metropolitan Relief Tunnel. The Boston Main Drainage District is now being partially served by the Boston Main Drainage Tunnel with overflow being continued to Moon Island. (See Exhibit 2-9).

. Boston Marginal Conduit

The Boston Marginal Conduit, located in Storrow Drive, receives overflows from the combined sewers which discharge dry weather flows to the West Side Interceptor. The invert of the conduit is at elevation -1.5 feet (Boston Base) throughout its entire length. Presently the Boston Marginal Conduit depends on the tide level for gravity discharge to the Charles River Estuary. The conduits lack of proper slope restricts its operating capacity. High tides can preclude discharge to the estuary. Also, storm flows coincident with high tide cause surcharging in the conduit with resultant overflows to the Charles River Basin. The conduit is scheduled to be extended to connect to the North Metropolitan Sewage System as part of the Charles River Elevation Control Project.

. Wastewater Treatment Facilities

The wastewater treatment facilities are operated and maintained by the Sewage Division of the MDC. The purpose of the Division is to construct, maintain and operate a system of sewage disposal and treatment for the member communities.


PARK PLAZA
combined sewer overflow
WEST SIDE INTERCEPTOR
BOSTON MARGINAL CONDUIT
overflow
CHARLES RIVER BASIN
flows ≤ estimated runoff of five year storm
BOSTON MAIN INTERCEPTOR
CONDUIT EXTENSION
BOSTON MAIN DRAINAGE RELIEF SEWER
CHLORINATION-DETENTION PUMPING STATION
CHARLES RIVER ESTUARY
low flow ≤ 5 mgd
BOSTON MAIN DRAINAGE TUNNEL
CHARLESTOWN BRANCH SEWER
NORTH METROPOLITAN TRUNK SEWER
DEER ISLAND SEWAGE TREATMENT PLANT
BOSTON HARBOR PRESIDENT ROAD CHANNEL
EXISTING SYSTEMS
CHARLES RIVER MARGINAL CONDUIT PROJECT

MAIN
Engineers

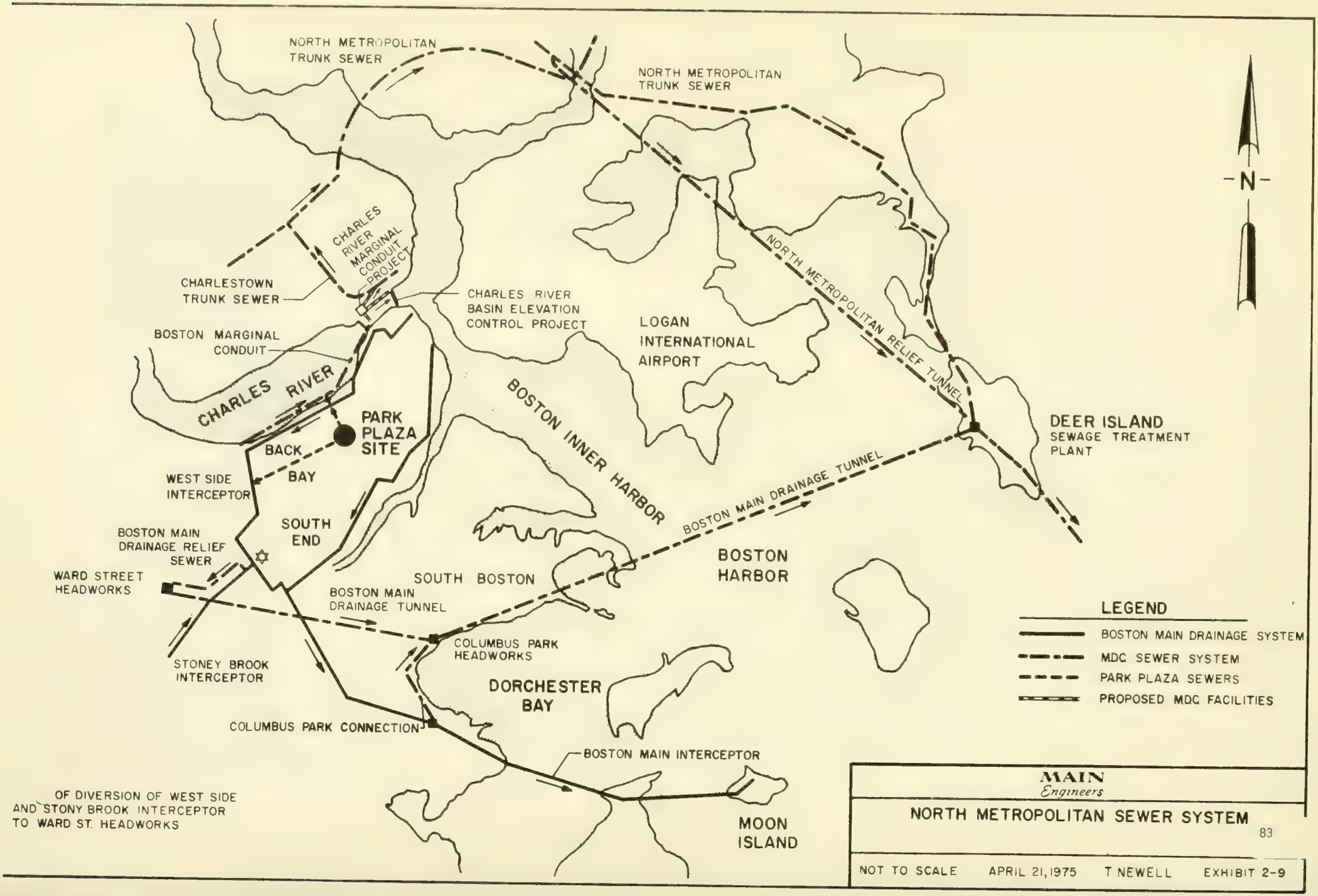
PROPOSED PARK PLAZA DEVELOPMENT AREA
SEWERAGE SYSTEMS

APRIL, 1975 EXHIBIT 2-8

The facility of concern here is the Deer Island Treatment Plant (DITP). The DITP facilities of the MDC include the old Winthrop Pumping Station, which pumps from the North Metropolitan Trunk Sewer, and the main plant itself. The plant includes a large capacity pumping station, which pumps from the terminal shafts of the Main Drainage Tunnel and the North Metropolitan Relief Tunnel, sedimentation basins, sludge pumps and chlorination chambers.

The treatment plant provides primary treatment followed by chlorination. Two outfall pipes extend to the vicinity of Deer Island Light in the President Roads Channel at a depth of 50 feet MSL. Two relief discharge outlets are provided near the shore. Additionally provisions have been made to discharge digested sludge through the ocean outfalls.

The present design capacity of the DTIP is 343 MGD. The 1 MGD sanitary flow from the Park Plaza area represents 0.29 percent of the design capacity.


NORTH METROPOLITAN TRUNK SEWER
NORTH METROPOLITAN TRUNK SEWER
CHARLES RIVER MARGINAL CONDUIT PROJECT
CHARLESTOWN TRUNK SEWER
CHARLES RIVER BASIN ELEVATION CONTROL PROJECT
LOGAN INTERNATIONAL AIRPORT
NORTH METROPOLITAN RELIEF TUNNEL
BOSTON MARGINAL CONDUIT
CHARLES RIVER
PARK PLAZA SITE
BACK BAY
WEST SIDE INTERCEPTOR
BOSTON INNER HARBOR
DEER ISLAND SEWAGE TREATMENT PLANT
BOSTON MAIN DRAINAGE TUNNEL
BOSTON MAIN DRAINAGE RELIEF SEWER
SOUTH END
WARD STREET HEADWORKS
SOUTH BOSTON
BOSTON HARBOR
BOSTON MAIN DRAINAGE TUNNEL
COLUMBUS PARK HEADWORKS
STONEY BROOK INTERCEPTOR
DORCHESTER BAY
COLUMBUS PARK CONNECTION
BOSTON MAIN INTERCEPTOR
OF DIVERSION OF WEST SIDE AND STONY BROOK INTERCEPTOR TO WARD ST. HEADWORKS
MOON ISLAND
N
LEGEND
BOSTON MAIN DRAINAGE SYSTEM
MDC SEWER SYSTEM
PARK PLAZA SEWERS
PROPOSED MDC FACILITIES

MAIN
Engineers

NORTH METROPOLITAN SEWER SYSTEM

NOT TO SCALE APRIL 21, 1975 T NEWELL EXHIBIT 2-9

THE GENERAL SOCIAL-POLITICAL ENVIRONMENT

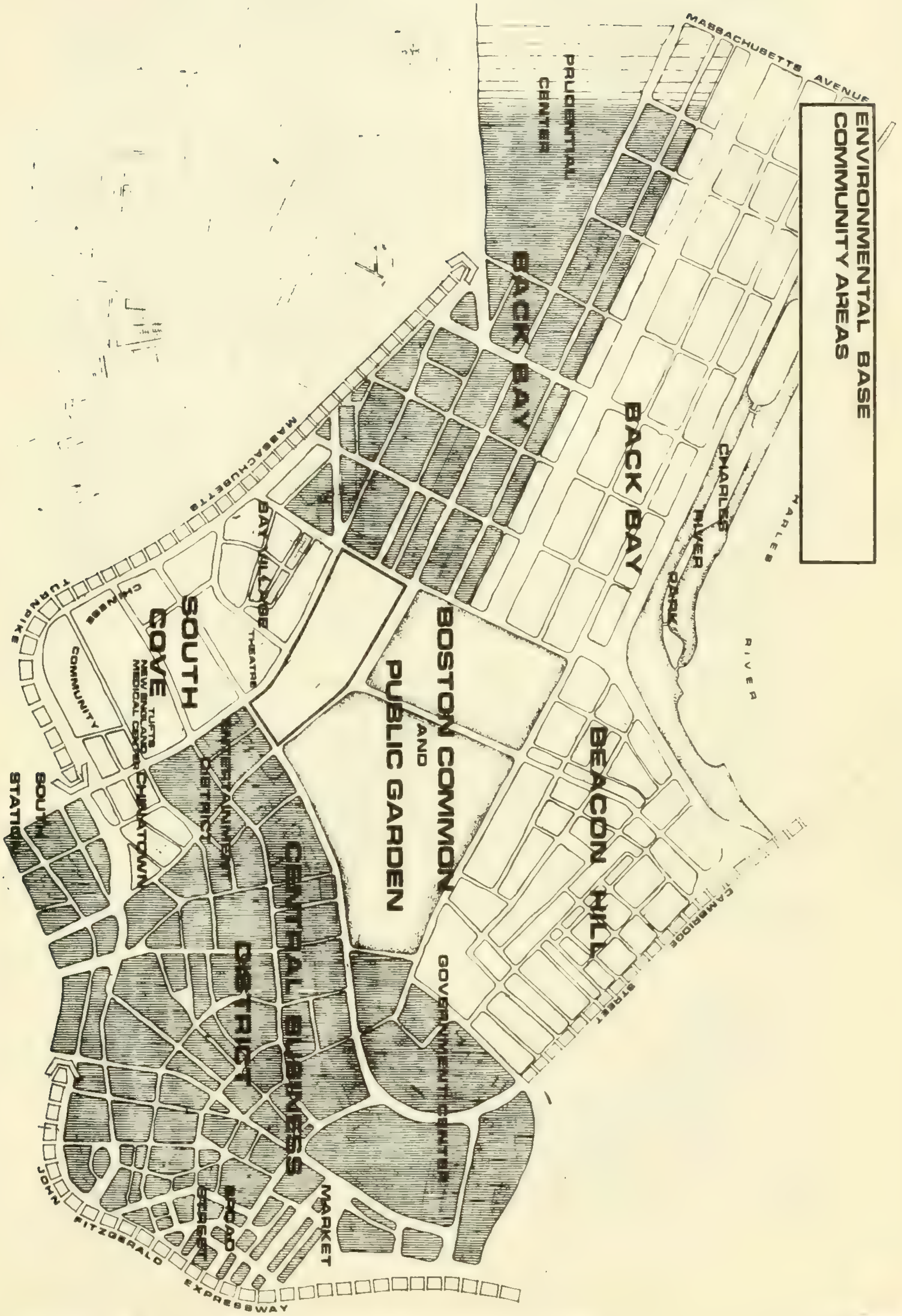
Within the downtown area is a group of distinctive neighborhoods, each with special features, problems and objectives (see map; following page). Common to all of them, however, are the public facilities and services including schools, health clinics and fire protection which are essential to any community. Other institutions and cultural and recreational facilities such as the Public Library at Copley Square and Boston Common are relied upon heavily by the residents of these communities but are shared with the thousands of employees and visitors who enter downtown Boston daily.

Contained in this section are profiles of each of the residential neighborhoods including:

Back Bay
Beacon Hill
West End
Chinatown
Bay Village

As well, a series of community facilities maps locating the institutions, facilities and amenities within the study area are included.

ENVIRONMENTAL BASE COMMUNITY AREAS



PARK PLAZA BUILDING STUDY STAGE
ENVIRONMENTAL IMPACT ANALYSIS

PREPARED BY:
BOSTON REDEVELOPMENT AUTHORITY
CITY HALL BOSTON, MASSACHUSETTS
THE SARATOGA ASSOCIATES
BRISTOL, LITYNSKI, WOJCIK, TARBOX, HOLLISTER, CINQUINO, AND MOORE P.C.
THE ARCADE SARATOGA SPRINGS, NEW YORK

1. NEIGHBORHOOD DESCRIPTIONS - Demographic and Group Character

a. The Back Bay

At its nearest point, Arlington and Boylston Streets, the Back Bay lies adjacent to the proposed Park Plaza Project. The furthest point of Back Bay is in excess of one mile from the project area.

The portion of the Back Bay in closest proximity to Park Plaza is the Boylston-Newbury Street area, which is the commercial district of the Back Bay. Boylston Street is characterized by office and retail uses. Newbury Street, on the other hand, is distinguished by specialty retail uses such as boutiques and art galleries.

The residential area of the Back Bay extends from Commonwealth Avenue to Back Street. This residential area is a composite of private residences, dormitories and institutional uses.

Before the filling of the Back Bay tidal flats, beginning in 1857, a plan to govern construction on the newly created land was formulated by the architect hired by the area's developers. Lot size, building height, and setback from the gridded streets were stipulated in advance and are reflected in the brick and brownstone mansions and townhouses that were built over the period between 1860 and 1900. As a result, the Back Bay has been characterized by architectural harmony. The Back Bay Architectural Commission was established in 1966 in recognition of the need to present the character of the Back Bay.

After World War I, the homes of the Back Bay were subdivided into apartments to provide housing for the city's growing population. And in recent years a number of educational institutions as well as office uses have moved into Back Bay structures, depleting somewhat the supply of housing once available, as well as removing a sizable portion of the properties from the tax roles of the city. Some conversion to residential use has continued to the present, however, with the recent rehabilitation of the Hotel Somerset to rental apartments and the modification of the Hotel Vendome to condominiums.

A major change in the Back Bay residential area in recent years has been the dramatic increase in youth -- both students and professionals. A high percentage of Back Bay population falls within the 18 to 24 year-old age group, reflecting the concentration of educational institutions, although some 60 percent of this age group in the Back Bay is employed. Along with students, the Back Bay is also the residence of many professionals and managers, and the income level and educational achievement for this community are correspondingly high compared with the rest of the city.

DEMOGRAPHIC CHARACTERISTICS OF THE GENERAL SOCIAL-POLITICAL ENVIRONMENT

	City	Back Bay	Beacon Hill	West End	Chinatown	Bay Village	Future Park Plaza
1970 Population	641,000	15,485	10,743	2,864	1,825	883	---
1985 Population	690,000	19,832	10,752	5,639	4,052	924	(1,125-2,468)
Age Under 15	24%	3%	7%	2%	17%	7%	4%
15-24	22	44	30	17	28	23	---
25-34	12	19	25	21	15	18	---
35-64	29	23	26	43	30	35	40
Over 65	13	11	12	17	10	17	30%
Income median family	$ 9,135	$13,670	$14,630	$18,915	$6,780	$10,780	$26,000
median individual	$ 2,820	$ 3,620	$ 5,095	$ 5,610	$1,215	$ 3,905	$16,975
%High School Graduates	54%	88%	86%	74%	34%	63%	87%
Median education level	12.1 yrs.	16.0 yrs.	16.3 yrs.	13.7 yrs.	9.5 yrs.	12.5 yrs.	---
Occupation: professional	16.5%	33%	40%	37%	17%	20%	42%
Managerial, Adminis.	5.5%	13%	11%	10%	4%	9%	34%
Work in CBD	14%	20%	20%	20%	40%	40%	60%
Dwelling units	235,000	8,750	7,012	1,616	702	550	995-1645
Vacant	6%	5%	6%	10%	10%	10%	---
Owner-occupied	27%	4%	10	2	9	12	0
1 Person Household	29%	60%	61	53	47	61	55%
1 & 2 Person	58%	89%	87	89	67	85	95
Same Unit 5 years	50%	20%	20-29	28	56	41	---
Average Household size	2.9 pers.	1.9 pers.	1.7 pers.	1.8 pers.	3.0 pers.	1.9 pers.	1.5 pe

Coinciding with the predominance of young people, the dwelling units and household sizes in the Back Bay are small. There are few families and about 40 percent of the area's residents live alone. Almost all of Back Bay housing is now devoted to rental units, with rent levels above the city average but increasing at the same rate as the rest of the city. A high vacancy rate shown in the 1970 Census further reflects the transient nature of young people in the area rather than slack demand.

In spite of the dramatic influx of young adults into the Back Bay, two trends point toward the stabilization of the Back Bay as a residential community: the growing conversion of older apartment houses to condominiums (about 40 structures with some 750 units have been converted), and a slow decrease in the number of educational institutions in the area, with the return of their buildings to residential use.

b. Beacon Hill

The Boston Common and the Public Garden provide a natural barrier of almost one-third of a mile between the proposed Park Plaza development and the beginning of the Beacon Hill community. The furthest point of Beacon Hill, the North Slope, is located approximately one mile from Park Plaza.

Beacon Hill is known for its charming, narrow streets of Federal and Victorian rowhouses. Developed during the first half of the nineteenth century, each street has its own special character, and the buildings, which vary in style and size, reflect the architectural and social development of Boston during that period. The entire district is a Registered National Historic Landmark, and the Beacon Hill Historic Commission, established in 1955, is charged with protecting this visual history.

The section of Beacon Hill in closest proximity to Park Plaza is known as the South Slope. The homes in this area are among the finest found anywhere in Boston. A large percentage of these homes (13%) are owner occupied. The occupants are largely middle-aged couples and families and the elderly although in recent years there has been a significant increase in the number of young persons (20 to 24 years of age).

Beginning at Revere and Myrtle Streets, and extending to Cambridge Street is the North Slope section of Beacon Hill. This area is characterized by a youthful, more transient population of unrelated individuals living in rented units. Building size and conditions, sanitation, and parking congestion present greater problems on the North Slope than on the South.

The characteristics of Beacon Hill residents vary slightly from the general pattern of downtown residents. They tend to have higher incomes, pay higher rents, and have smaller households than most residents in downtown Boston, and according to the U.S. Census, Beacon Hill, with the Back Bay, had the largest proportion of residents who moved to the area during the two years prior to 1970.

The commercial areas of Beacon Hill are located along Charles and Cambridge Streets. The major retail uses on Charles Street are antique stores, eating and drinking establishments, apparel, office, retail, and service establishments. With the exception of the antique stores, the majority of the retail uses along Charles Street are of a local business nature and do not attract metropolitan shoppers.
The Cambridge Street shopping area which has the largest commercial uses in the community actually consists of two areas:

- Cambridge Street itself, characterized by a high proportion of restaurants and shops catering to transient and neighborhood business.

- Charles River Park Shopping Center, a more regionally-oriented facility which includes movie theaters, a supermarket and office space.

The formation of the Cambridge Street Community Development Corporation, which includes Massachusetts General Hospital, Suffolk University and the Beacon Hill Civic Association, has enabled the institutions and residential community to formulate a general plan for the future of Cambridge Street, especially institutional expansion there.

A review of the trends of population, housing and retail uses indicates that Beacon Hill is a vibrant community whose population and housing stock have been adjusting to the city-wide trends towards a younger population and smaller household. The commercial district of Charles Street is the only area of the community which has been experiencing some uncertainty as evidenced by a high rate of vacancies (10%) and turn-over of retail establishments.

c. West End

The West End, situated between Beacon Hill and North Station, includes the Charles River Park development, Massachusetts General Hospital, and some older housing along Cambridge Street. Recent construction, which replaced the tenements of an established Italian and Jewish community, contains middle- and upper-income housing, office and commercial space, and parking. Middle-income and elderly housing and an office building are now under construction.

The residents of Charles River Park -- the large majority of West End residents -- share the general characteristics of the downtown population, although there are proportionately more adults aged 25 to 64 and relatively fewer young people and children than in the downtown population as a whole. Nearly half of the residents are professionals and managers, and many of them work in the medical complex.

d. Chinatown

Chinatown has served as the social, commercial, and residential core of the city's Chinese community for almost 100 years. It is one of the most densely populated areas of the city and the heart of the city's garment industry.

Approximately 2,000 persons live in Chinatown, which consists of the Beach Street area (the commercial center at Harrison Avenue and Knapp Street, and the residential area of Oxford, Hudson and Tyler Streets and Oxford Place), and the adjoining eastern half of the South Cove Urban Renewal Project. Chinese commercial activity in the area, in addition to being a major source of Chinese employment, frequently provides the only source of indigenous Chinese goods and services in New England.

A recent BRA analysis of land use in the Beach Street Area reveals that the area is heavily built up, even by downtown standards, with little vacant land, much of it (35,000 square feet) devoted to surface parking. Industrial and commercial uses predominate, accounting for over 70 percent of the gross floor area, yet residential and community uses are intermingled. The result is a complicated mix of activities, both from parcel to parcel and vertically within buildings.

It is estimated that 60 to 80 percent of the residents of Chinatown do not speak English. Age distribution and average household size are comparable to figures for the city as a whole. Because of its family base, Chinatown is more stable than the other downtown neighborhoods, but the income level is lower than the average. Most of the occupied units in the vicinity of Chinatown are rented, and over half of the households had an annual income of less than $5,000 in 1970.

As assessment of the nature and impact of the Chinese presence can be obtained by examining the land and buildings under Chinese ownership. The Chinese presently own nearly 45% of the land and 75% of the 106 buildings in the Beach Street Area. The Chinese-owned buildings run from 1 to 8 stories in height.

About one-fourth of the 490,000 square feet of space is used for restaurants, grocery stores, gift shops, and food processing concerns that are primarily located on lower floors of buildings. Nearly one-third of this space serves residential uses, primarily in upper floors of three- and four-story buildings. The remaining space is divided between community uses and non-Chinese rental of space.

The garment industry has been part of the Beach Street Area almost as long as the Chinese. Garment related activity in the district includes the manufacture, wholesale and retail of clothing articles, accessories and dry goods. In addition, service companies to maintain garment industry equipment, and ILGWU union offices are also located within the district boundaries. The garment industry owns 30 larger buildings encompassing 400,000 square feet.

e. Bay Village

Bay Village is a small historic neighborhood, bounded by Charles Street South, Tremont, Arlington and Stuart Streets. Most of its 600 households live in small brick townhouses built in the mid-nineteenth century.

Although an increasing number of these houses have been purchased as in-town residences in the past eight years, as of 1970, more than 85 percent of Bay Village residents were renters.

Housing units are generally small, as are those of the Back Bay and Beacon Hill. Bay Village residents are older on the average: 17 percent are over 65 years old. The Bay Village population is mobile by city standards, but it is less transient than that of the Back Bay or Beacon Hill.

Public improvements resulting from the South Cove Urban Renewal Plan -- which includes Bay Village -- have helped to encourage considerable housing rehabilitation through private and Federally assisted rehabilitation loans. These community facilities, parks, and major street improvements have done much to improve the physical condition of the neighborhood.

2. General Social-Political Issues

All Downtown Neighborhoods

1. Need to maintain residential character through stronger code enforcement and increased capital improvements, both public and private.
2. Need to monitor and control the proliferation of restaurants and liquor licenses, particularly in the case of adult entertainment uses.
3. Poor condition of parks and recreational facilities due to intensive use.
4. Lack of sufficient residential parking in convenient locations.
5. Need for social services for the elderly.
6. Concern for continued delivery of city services including street cleaning, trash pick-up, rodent control, dog control, code enforcement, parking enforcement, sidewalk repair.
7. Need for improved street character, through additional lighting, planting and maintenance of trees, enforcement of the sign code.

South Cove (Bay Village and Chinatown)

1. Potential intrusion of the adult entertainment district.
2. Excessive traffic volumes and hampered pedestrian access.
3. Disruption caused by construction and utility relocation.
4. Overcrowding of the housing with attendant problems in health and sanitation.
5. Deteriorated condition of the housing stock.
6. Inadequate recreational facilities and open space.
7. Concern over air quality, particularly near the turnpike.
8. Large number of low-income families.
9. Continued need for jobs for unskilled and semi-skilled workers.

Back Bay

1. Need to reinforce Boylston and Newbury Street commercial activity, with both City and private efforts to improve the mix of businesses.
2. Policy of converting former institutional property into apartments where possible.
3. Protect low and moderate rent levels and encourage rehabilitation through any available Federal programs, including Section 8.

Beacon Hill

1. Minimize through-traffic on Charles Street.
2. Improve the retail mix on Charles Street through both City and private efforts.
3. Maintain population balance through stabilizing rent levels and encouraging longer residency.
4. Stability of the rental market for existing apartments.

SOURCE:

BRA District Planners' Neighborhood Profiles, Fall 1974 and Spring 1975.

THE GENERAL ECONOMIC ENVIRONMENT

During the last decade, Boston experienced a significant economic revival and reversal of a previous decade of decay and stagnation. Following the Second World War, there was a dramatic decline in Boston's residential population. The upper-and middle-income families followed prosperity out of the city, attracted to the suburbs by easily financed housing and new schools. The quality of the living environment in the central city began to deteriorate, and it was loudly prophesized that downtown would soon be home to the very rich and the poor. But over the decade of the sixties, there was a resurgence of job growth, an office building boom, and a stabilization of the city's population.

The core area of Boston has played a special role in the city's renaissance. Although the downtown land area represents less than 8 percent of the city's land area, it contains almost all the vital business, financial, and government facilities of the city and, to a large extent, the metropolitan region. During the past decade it has experienced an important increase in new, quality office space, middle-and upper-income high-rise apartments, and an increase in the upgrading of cultural, entertainment, and supporting facilities. Since the construction of the Prudential Center in 1968, the skyline of the downtown has changed dramatically. The downtown also contains 25,439, or 12 percent, of the city's occupied units and and 8 percent of the city's 1970 population.

The Role of Downtown Within the Regional Economy

Downtown Boston hosts a variety of economic enterprises not encountered to any comparable degree elsewhere within the region, businesses that depend on the face-to-face communication, specialized markets, concentrated labor pool, and economies of aggregation that only the core of a major metropolitan area can provide. Moreover, the downtown economy is rooted in the roles it has historically assumed within not only the Boston area, but also the state, the New England region, and the nation.

- the seat of state government and a Federal administrative center for much of New England

- the office and financial center for New England

- a national center for higher education and medical services

- the retail, cultural, and entertainment center for the region

- the site of major historical landmarks and a national tourist attraction

- an international port and regional transportation center

The functions, in most instances, have continued to grow in importance over the years despite the structural changes in the New England economy and the ups and downs in national economic fortunes. These functions explain much of the physical character and day-to-day activity that distinguish the individual streets, neighborhoods, and districts of the downtown.

The "Service Revolution"

The traditional roles of Boston's downtown within the New England region have provided a strong element of continuity to the city's economic life. The previous two decades, however, have witnessed a major upheaval in the local economy: a dramatic growth in service employment coupled with an absolute decline in manufacturing jobs. This shift parallels national trends but, for the following reasons, has been more pronounced in the Boston area, particularly in the inner core:

. Boston was in a strategic position to benefit from the post-war "service revolution". Boston - because of its prestige, educational and medical institutions, its long specialization in government and other services, its financial community's venture, capital, and its special amenities - was able to garner more than its share of this new growth.

. The New England industries in non-durable goods (leather, textiles, shoes, apparel) declined as firms moved to cheaper labor markets in the south or succumbed to foreign competition.

. The suburbanization of the middle class was followed by exodus of selected manufacturing, wholesaling, retail, and, to a lesser extent, office activity from the central city. This well-documented phenomenon is attributable to a complex variety of factors: the automobile and the interstate highway program, the widespread preference for home ownership coupled with rising incomes and government mortgage programs, the inroads of trucking on rail traffic, and new land-intensive production technologies, to name only a few.

The transition to a service-based economy has had profound effects on the city's employment structure, the physical character of its downtown, and the general prosperity of its citizens. On balance, these effects have been highly beneficial, although the changeover, as will be discussed below, has not been without societal stresses and individual hardships which still demand the attention of public policy.

Most importantly, the city has freed itself from dependence on older, declining, low-productivity manufacturing industries and, reversing several decades of population and job loss, joined its fortunes to younger, more vigorous sectors of the national economy. For the purposes of census definition, services are a catchall category, including businesses as diverse as beauty parlors, palmistry, and computer programming. The importance of service growth for the health of the downtown's economy is that much of it

has come in what economists call high-value and high-technology services. The consultant who prepares a market profile for a firm in California, the surgeon who operates on a patient from Ohio, and the engineer who designs a hydro-electric project for a foreign government are, in effect, all engaged in producing exports for national and world-wide markets.

Strong growth in financial services was a central factor in the office building boom which the city has been experiencing since 1960. Today, with over 1,000 insurance companies, national banks, trust companies, savings institutions, cooperative banks, and other financial institutions, the city is the second largest financial center in the country. Over one-third of United States mutual fund assets are directed from Boston.

Impact of the Economic Revival on Development

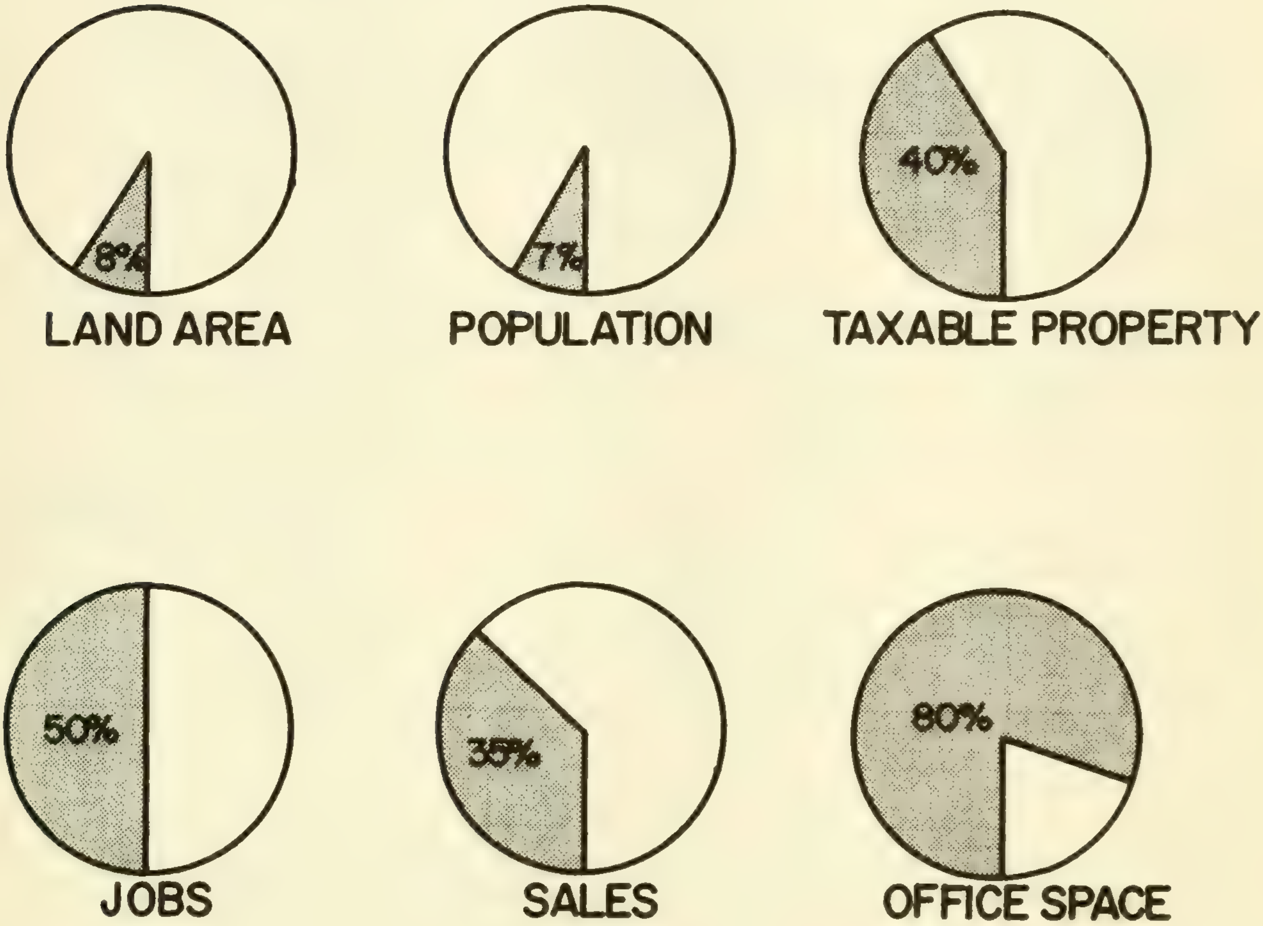
In the downtown, the most visible evidence of the service revolution has been the unprecedented boom in office building. Between 1960 and 1974, the downtown office space stock rose from 18.2 million square feet in 1974, a two-thirds increase in little over a decade. Another 8.0 million square feet is currently underway and scheduled for completion within the next three years. The appearance of the Keystone Building, the Prudential Towers, the New England Merchants Bank and many others on the skyline has been accompanied by an influx of professional, technical and clerical personnel in the 25 to 34 year-old age group. This influx in large part accounts for the population growth in downtown residential areas since 1970 and the rise in the median income level of downtown households.

The arithmetic of new jobs and higher incomes, when converted into housing demand, has elicited a ready response from the private market. An increasing proportion of new housing investment in the city went into the downtown over the past decade. This investment took the form of new apartment complexes (Harbor Towers, for example) as well as extensive rehabilitation in the Back Bay, Beacon Hill, Bay Village, and North End neighborhoods. Since 1960, the aggregate value of downtown housing, expressed in dollars of constant value, rose 80 percent. Furthermore, this new residential development, housing a "captive market" of single individuals and couples with high disposable incomes, has boosted those elements of the retail and entertainment industries catering to youthful lifestyles. The demand for housing should remain strong through the 1970's as evidenced by the low vacancy rates in existing units.

Current Needs and Future Prospects

The long-term prospects for the City's economy and subsequent growth in income for its population are promising, but the recent economic recession has taken its toll. While the City's service industries continue to show modest gains, other segments of the economy have suffered severe setbacks. Unemployment for the City's population is at a near record high of 10 percent and in some segments, such as the construction industry, unemployment is approaching 25 percent.

DOWNTOWN'S SHARE OF THE CITY ECONOMY



POPULATION TRENDS: 1960 - 1985

	Total Population		
Year	Downtown	City of Boston	Boston SMSA
1960	33,779	698,081	2,595,481
1970	36,738	641,071	2,753,700
1972 (est.)	43,600	659,200	NA
1985 (proj.)	55,794*	690,000	3,209,000
Annual Rate of Change:			
1960-1970	0.8%	-0.8%	0.7%
1970-1972	5.9	0.9	NA
1970-1985	5.1	0.7	1.6

Source: 1970 Census of Population
BRA Research Department, 1985 projected population.

* Assumes median Park Plaza Development alternative.

POPULATION CHARACTERISTICS
1970

Characteristic	City of Boston	SMSA
Median Family Income	$9,133	$11,448
Median Individual Income	2,819	2,997
Per Capita Money Income	3,093	3,702
Cost of Living (urban family of four intermediate level 1973)	-	14,893
Family Income		
Under $4,000	16.0%	9.3%
$4,000-6,999	18.5%	12.3%
7,000-9,999	21.7%	18.5%
10,000-14,999	25.7%	29.8%
15,000-24,999	14.8%	22.4%
Over $25,000	3.4%	7.7%
Average Household Size	2.9 persons	3.2 perso
Median Persons per Unit	2.2 persons	2.6 perso
ne-person Households	32.0%	20.0%
Two-person Households	33.0%	28.0%
Same Unit 5 Years 1965-70	44.0%	54.0%
Same Unit 2 Years 1968-70	64.0%	72.0%
Median Education Level	12.1 years	12.4 years
% High-school Graduates	53.5%	64.4%
% with 4 or More Years College	10.3%	15.8%
Age: Under 5	7.8%	7.9%
5 to 18	20.7%	24.2%
Over 65	12.8%	11.3%
Median age	28.8%	29.7%

LABOR FORCE CHARACTERISTICS
1970

Category	City of Boston	SMSA
Resident Labor Force (Civilian)	278,607	1,177,942
Employed Residents	266,505	1,136,474
Unemployed	4.8%	3.5%
Occupations		
Professional & Technical	16.5%	20.0%
Managerial	5.5%	8.9%
Clerical	26.6%	22.9%
Sales	5.7%	7.7%
Craftsmen and Foremen	10.3%	11.6%
Operatives	14.1%	13.9%
Laborers	4.5%	3.1%
Other Service	16.7%	11.9%
overnment Workers	19.0%	15.0%
Work in CBD	12.0%	7.0%
Use Public Transport to Work	39.3%	20.0%

EMPLOYMENT TRENDS: 1960 - 1985

	Employment		
Year	Downtown[a]	City of Boston[b]	Boston SMSA[b]
1960	NA	500,000	1,078,600
1970	242,000	525,000	1,303,600
1975 (est.)	272,000	528,000	1,321,500
1985 (proj.)	330,000	600,000	1,520,000
Percent of SMSA:			
1960	-	46%	100%
1970	18%	40	-
1975	20	40	-
1985	21	39	-

Source:

a. BTPR, Regional Systems, Nov. 1972, fig. 16, p.30; and BRA Research Department.

b. BRA Research Department, Expanding City of Boston Economy, update, July 1974.

LAND USE AND ECONOMIC CHARACTERISTICS
1970

Category	City of [a] Boston	SMSA
Population	641,053	2,753,800
Change 1960-70	- 8.1%	+ 6.1%
Land Area	46 sq.mi.	987 sq
Housing Units	232,406	890,981
Occupied Housing Units	217,622	859,701
Vacancy Rate	6.0%	4.3%
Owner-occupied Units	27.0%	53.0%
Office Space (1973)	28.3M s.f.	40.0M s.
Office Vacancy Rate (1974)	7.7%*	11.6%
Retail Space (1972)	23.0M s.f.	85.0M s.
Retail Sales (1972)	$1,677,000,000	$7,047,000,000
Retail Employment (1972)	53,217	197,287
Hotel Rooms (1973)	8,100	18,000
Open Space	1,980 acres	-
Manufacturing Employment (1970)	68,200	273,000
Value Added by Manufacturing (1967)	$1,166,000,000	$4,155,000,000
Manufacturing Firms (1967)	1,744	5,200

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* In CBD

** Within Route 128

a. For a listing of Downtown Boston building area, including housing units, office space, retail space, and hotel rooms refer to the Table which follows, Downtown Development Trends, 1975 - 1985.

THE CRITICAL ENVIRONMENTAL ISSUES OF PARK PLAZA

The following environmental issues have been identified, via the analytical process previously explained, as being the most critical and significant environmental impact issues capable of resolution as a result of the building study stage analysis. (For a full description of the issue resolution process, refer to the TSA Staff Report on Park Plaza Building Study Stage Environmental Impact Issue Analysis - Appendix Report #1).

The issues listed below are organized by phase of development activity. While the Park Plaza project has a much broader range of potential environmental impacts, the listed issues represent those which are the most critical for evaluation at this time. These issues, it should be pointed out, are those program-generated issues which can provide a basis for essential design development stage criteria. Because of the understandable absence of a full schematic design at this stage, many program-generated issues remain to be resolved, but the resolution of the following issues should permit the establishment of an appropriate level of density for the proposed project.

PHASE A - ACQUISITION

This phase of development activity is normally considered to be a short-term legal and financial action in which the local public redevelopment agency takes title to the land and improvements that comprise the site for the proposed project. There are two principal developmental actions involved:

#1 The Boston Redevelopment Authority acquires, through agreements with other public agencies, those lands and improvements in the project area community being utilized for public uses.

#2 The Boston Redevelopment Authority acquires, through negotiated purchase or by eminent domain power, those lands and improvements in the project area currently owned and/or operated by private interests.

Those two actions affect the public and private sectors of the Boston economic environment. As specific phase activities, they cannot be fully evaluated except as they are considered in context with the overall public-

private cost-benefit summary of the project, requiring the analysis of the economic impacts of all other phases of development activity. The major direct or first order issues that arise from this phase, however, can be stated:

- What public capital investment in land and improvements will be acquired for development purposes?
- What private capital investment in land and improvements will be acquired for redevelopment purposes?
- What will be the total acquisition cost, and how will acquisition funds be provided?
- What will be the administrative costs of acquisition - given normal processing and a minimum of contested eminent domain procedures?
- If bond funds are used for acquisition, how will this affect bonded debt of the City?
- How will acquisition affect taxable property values in the project site?

- How will acquisition affect the rental/lease income of existing property owners?

- How will acquisition affect the interest income of mortgagors of existing private properties?

- How will acquisition affect the property tax expenses of owners of existing private properties?

Indirect (or second- and third-order issues) of the acquisition phase include:

- Will the public direct and indirect costs of acquisition of the Park Plaza site cause any change in the City's real property tax rate?

- What annual property tax revenue will be lost, and for how long?

- How would acquisition bonds affect the City's debt margin and debt service costs?

- What will be the probable annual debt service costs (principal and interest) for Park Plaza acquisition?

PHASE B - RELOCATION OF EXISTING RESIDENTS AND BUSINESSES

The impacts of the relocation phase stem primarily from the following:

#1 Land use activity on site terminates, as residents and businesses are relocated.

#2 The demographic structure of the site changes because of the movement of people out of the project area. The Park Plaza site has few residents, but a substantial daytime working population that will be displaced by the project. Relocation has a regional impact, since the people now residing and working in the project may choose to move completely out of downtown Boston. Because this population is likely to remain somewhere in the regional area, the impact can be considered neutral.

#3 As a result of the above, demands on existing circulation, utility and functional service systems are reduced.

#4 The movement of people and businesses out of the area directly affects the private economic struc-

ture of the existing site - with the most important being the amount of business activity.

The following are critical direct (or first order) issues of the relocation phase that have been addressed during the building study stage environmental impact analysis:

- What will be the changes in the existing site demographic character by the relocation?

Given the entire project site as an environmental base condition, we can determine the relative extent of land use relocation activity caused by each alternative. This information, per se, is only useful as it reflects the magnitude of adverse change in other critical areas of environmental concern, for example:

- To what extent will current land use types be terminated? Are such land use types essential to the Downtown or neighboring community areas?

Land use type changes, although neutral in inherent character, can stimulate both adverse and beneficial impacts on other areas of the site environs, and in spite of the unpredictability of the impacts, these issues should be

new activity) it must be analyzed as part of the total public-private cost-benefit analysis of the project:

The relocation of resident and business populations from the site will generate a loss of personal income, sales income and interest income.

- To what extent will this loss affect the private economic vitality of the downtown core - and for how long a period?

- To what extent will existing private economic interests gain from relocation due to decreased expenses?

Indirect (second and third order) impacts of relocation will affect a broader range of environmental conditions or characteristics. Many of these indirect impacts will be beneficial - stemming from decreased demands on circulation, utility and functional service systems. Others, however, will be adverse:

Stress on the natural physical environment (soils, air, water, vegetation and fauna) and the perceptual (noise, vibration) environment of the project will be momentarily relieved. In all probability, however, these beneficial im-

pacts will not be perceived - due both to their minor degree of magnitude, and the fact that the demand on the total downtown natural environment is such that external pressures will cause a "filling" of any tolerance gap created by Park Plaza relocation activities.

Indirect impacts on land use distribution will be generated by relocation of land use types in the project. This impact could be either/or beneficial and adverse:

- Will relocation of existing businesses from the Park Plaza project site cause a weakening of the viability of the existing land uses in the downtown core and neighboring community areas?

Indirect land use impacts are unpredictable at this stage and highly dependent upon which of the alternative development programs are selected. Although these impacts are unpredictable, they can be mitigated by appropriate public action as described in Part VII of this report.

Relocation will also alter the built character of the project site. A significant adverse impact will be the change in the "night profile" or nighttime visual character of the site. As people leave, and land use activity ceases, the lights are turned out. Because of the current low density

of development, this "black-out" will have a minor effect on the Boston night skyline as viewed from a distance. But the lack of illumination can generate other indirect adverse impacts:

- To what extent will the vacated darkened project area generate a nighttime crime hazard?

This impact has further indirect impacts on public safety capacities and expenses.

Other indirect impacts on the built character of the area relate to the deterioration of abandoned structures and the adverse impact this can have on fire protection and the unique visual character of the environs.

Indirect impacts of relocation on the circulation systems of the Park Plaza project site are best characterized as a series of equilibrium adjustments - changes in travel needs and destinations - as people and land uses relocate. Some of these could be adverse, others beneficial, depending upon the pattern of relocation and relationships to existing transportation systems in the areas of relocation.

Indirect impacts of relocation on utility systems, however, are not as fluid as those on circulation systems. Here, the

impacts will be clearly beneficial - except in terms of income losses to utility companies - because of fixed loading.

A major impact issue of relocation is the effect on on-site and surrounding semi-public and private institutions.

- o What important institutions (such as the Seaman's Union and Womens Industrial Trade Union) will be displaced by Park Plaza? What steps will be taken to insure that such institutions are sustained as part of the downtown Boston environment?
- o To what extent will the relocation of residents and business employees affect the size and character of institutions immiediately adjacent to the project area?

This impact is also highly dependent upon which alternate development program is selected. In addition, information on current project area population utilization of near-by institutions is not available.

Function service systems (education, health, etc.) currently serving the Park Square area will also experience a lowering of demand during the relocation phase. The exceptions, as indicated earlier, may be increased demands for public safe-

ty services during the time period that the site is vacated.

Relocation phase indirect impacts on the economic environment include the following:

- What will be the loss in non-property tax revenue caused by relocation?
- What residential and business relocation subsidy will be required?
- What user fee revenue will be lost?
- How will other private income and expenses be affected by relocation?

PHASE C - DISPOSITION OF PROPERTY FOR REDEVELOPMENT

This phase of development activity is similar to the acquisition phase in that it represents a legal and financial transaction affecting only the economic component of the environment.

#1 After the planning of disposition parcels, the BRA sells part of the project site to be used for public purposes - such as the new Charles Street alignment, The State Transportation and Construction Headquarters, etc.

#2 Private developers also purchase portions of the project site for redevelopment for private economic purposes.

These two disposition actions also affect the public and private economic sectors.

- o What areas of the project site will be used for public purposes and thus be tax exempt?
- o What areas of the project site will be used for private development?

- What revenue will be received from the disposition of property and how will this revenue be used to further public purposes?

- What will be the change in taxable property value as the result of disposition?

- What will be the general government service costs associated with disposition?

- How much property tax will private developers pay for purchased land and existing improvements, and for how long?

- What will it cost private developers to operate and maintain the site prior to demolition?

- To what extent will the private economy gain from interest income associated with private land purchase financing?

PHASE D - DEMOLITION OF EXISTING STRUCTURES

This phase of development activity, while temporary, generally causes permanent changes in the environment. The principal direct impacts of demolition are as follows:

#1 Built character of the area will change dramatically as buildings are demolished.

#2 Existing circulation, utility and functional service system structures will be demolished thereby reducing the actual physical capacity of these systems.

#3 Private capital investment in buildings and fixed equipment will be changed as these are demolished by the owner-developer.

Direct impacts on the physical built character (structural coverage and structural height) are insignificant except as they generate the following indirect impact issues:

- To what extent will unique structures (those of historic and/or architectural significance) be lost by demolition?

o To what extent will the spatial form of the Park Square area be changed by demolition?

o What important site amenities will be lost through demolition?

o Will demolition cause any damage to nearby structures?

Likewise, impacts of demolition on circulation, utility and functional service systems are not significant of and by themselves, but only as they reduce physical capacities of those systems and thereby require equilibrium adjustments impacting other off-site system capacities. Together with the demolition of structures they do, however, generate a number of indirect by adverse impacts on other elements of the natural and economic environments.

These indirect impacts of demolition on the natural environment affect air quality (demolition dust and emission), climate (changes in wind direction and solar exposure), surficial hydrology (run-off) and faunal habitat. The latter could be significant, if the older structures harbor large populations of rodent and bird pests which would migrate to nearby areas. These second order impacts are mostly controllable with appropriate planning, construction technology

and monitoring. An even wider variety of third-order impacts on the natural environment can result if these controls fail to be established.

Noise and vibration during demolition can also impact pedestrian use of the nearby areas, impair health, and reduce business volume and efficiency in nearby areas. These impacts are regulated by City ordinance to the extent practical, but can be expected to cause some adverse impact regardless of these controls.

Indirect economic impacts of demolition on the environment include the reduction of public revenues from taxes on property improvements, as well as beneficial impacts on reduced operating expenditures for those public systems removed by demolition. Private economic impacts include the possible increase in operating and maintenance costs to nearby property owners and businesses and the loss of sales income due to nearby demolition activity.

PHASE E - EXCAVATION AND SITE PREPARATION

This phase of development activity consists of the following principal activities:

#1 The construction labor force is mobilized at the site.

#2 Purchases of building materials and equipment.

#3 The excavation of earth to provide for the foundations of new structures.

It should be noted that all off-site temporary construction impacts (labor force, materials) are included in this phase simply for the sake of analytical convenience.

Major impacts on the natural environment can result from this phase of development, but in the case of Park Plaza where the site is essentially a cleared urban area, direct changes to land form, vegetation and faunal resources are not applicable. The excavation of soil, however, can generate a series of other impacts, and the key direct impact issue is:

o To what depth will excavation of soil be carried?

Of and by itself, this impact is neutral but in the particular instance of Park Plaza, there are significant potential indirect impacts:

- How will excavation alter the ground-water table in the area?
- How will excavation be controlled to prevent soil subsidence damage to adjacent structures?
- What procedures will be followed in the event that pre-colonial or early American artifacts or other items of archeologic interest are discovered?

Ground-water table impacts can have further implications.

- Will excavation cause a lowering of ground-water table to the extent that the foundations of nearby buildings, on the vegetation of the Public Garden and Common will be affected?

Indirect impacts of excavation and construction activity on noise and vibration levels, circulation and utility systems are temporary and largely controllable. This phase includes an analytical accounting of the impact of the mobilization of the construction labor force and the purchase of

building materials and equipment. Although temporary, these impacts are generally quite beneficial to the local economy, and are considered in the building study stage analysis.

PHASE F - CONSTRUCTION OF NEW DEVELOPMENT

This phase of development program activity involves a series of direct actions as follows:

#1 Construction of new development generates changes in structural coverage and height, which by themselves are not adverse, but which can generate a wide range of indirect impacts on the natural physical and built physical environments.

#2 Along with new buildings, new circulatory and utility systems are put in place to serve the project. New functional service systems may also be added.

#3 Public and private investment in buildings and other improvements takes place during this phase.

Indirect (or second and third order) impacts of the construction phase are as follows:

o What will be the effect of new construction on bedrock geology? Will construction of Park Plaza involve abnormal foundation costs or cause failures in the bedrock structure used as foundation support, and what would be the impact on surrounding buildings?

- To what extent will construction activity adversely affect air quality?

- What will be the impact of new structures on near-ground wind speeds and directions?

- To what extent would new structures cause shading of the Common and Public Garden and other nearby pedestrian attractions?

- To what extent will the planting of new vegetation, as part of project site improvements affect other environmental conditions - such as faunal habitat, scenic vistas, visual character, etc.?

- Will the project's physical character conform to the general urban built character of the surrounding environs?

- Will circulation and utility systems, as designed, be adequate to accept the traffic and utility loads of the project?

- What specific functional service systems (education, health, social services, parks and recreation, cultural activities) will be built into the project?

Will they serve only project residents - or will they be designed to accomodate off-site interests and demands?

- When will new development provide a return to the City in terms of property tax revenues - and how much will these be?

- What will public capital improvements cost and how will they be paid for?

PHASE G - OCCUPANCY AND USE OF THE SPACE

Occupancy and use of the newly developed space obviously has the most pronounced direct and long term impacts of the entire development cycle:

#1 The project site is permanently repopulated on-site.

#2 Land use activity resumes.

#3 Circulation, utility and functional service systems are subjected to new demands as generated by the user population.

#4 Private economic activity commences providing both costs and benefits to the public economy of the downtown area.

These basic direct impacts generate a series of indirect impacts on all other components of the environment:

o To what extent will the increased density of the project cause adverse impacts in the form of compaction of soils in the Boston Common and Public Garden? What will be the effect of this impact on vegetation?

- How much additional air pollution will be generated by the project use and occupancy?

- Are sewer systems adequate for treating sanitary sewer loads of the project without adverse impact to the pond in the Public Garden, the Charles River Basin and the Boston Harbor?

- How will the increased use of the Public Garden and Boston Common affect vegetation in those areas?

- To what extent will the new population introduce additional pets into the area? What will be the effect of a higher pet population on the Common and Garden and general public health?

- What will be the change in noise and vibration levels, and how will these affect public health and welfare?

- What will be the impact of new land use activity? Will the project stimulate business, or will it detract from viable retail establishments in the core retail area and Boylston Street? How will the project strengthen adjacent land use activities?

o To what extent will reuse of the area enhance the unique quality of the downtown core? How will the use of the project affect the night profile of the downtown core area of Boston?

o What will the community gain in new non-property tax revenue from the project?

o What will be the costs of providing public utilities and services to the new population - and how will this affect operating budget expenses?

o How much sales income will the project generate?

o Will the new development be marketable?

o Is the new development financially feasible?

COMMUNITY IMPACTS

The impacts of the Park Plaza project on surrounding neighborhoods and communities are an amalgamation of the above general impacts as they may affect specific community areas. From the perspective of these communities, the impact of the project is a significant, specialized concern. In the following section on the general environmental base of Park Plaza, these specific, critical community issues are identified and discussed.

- What will be the impact of user populations on circulatory systems? What modes of transportation will be required, and do these systems have the physical capacity to accept increased demand?
- To what extent will utility demands of the user population require system changes?
- How will the project indirectly affect population education-health levels, income and occupational characteristics of the core area?
- To what extent will new development strengthen existing semi-public and private institutions in the area?

- To what extent will new development require changes in political districting? Will these changes include additional consideration of minority groups?

- What will be the demands of the new project on public functional service systems for such things as education, health, parks and recreation, etc?

As stated in the Basic Introduction to this report, an environmental impact statement is simply an effort to illuminate the political decision-making associated with most development activities. In the end analysis, acceptance of the recommended project density is a process of social political significance.

The following Chapter treats this element in more depth, but it is useful to point out that the function of the EIS is strongly related to public policy.

THE 1975 ENVIRONMENTAL BASE ANALYSIS MODEL

PURPOSE

The 1975 Environmental Base Analysis (EBA) Model is one of the most important bases for testing the impacts of the Park Plaza project. It is used for the following purposes:

- As a base condition for determining the impacts of acquisition, relocation, disposition and demolition phases of project development.
- As the ultimate base for evaluating the impact of the completed project in terms of change from current conditions.

The 1975 base model is essentially the most reliable of the three test bases because it has a minimal amount of predictive quantification. The 1980 and 1985 EBA models represent the 1975 base with projected changes to key environmental components required for testing the impacts of future phases of development activity. These projected changes include both those changes that are derived from earlier Park Plaza development phase actions, as well as changes to the environmental base caused by developmental activities other than

the Park Plaza project.

The most important parameters of the 1975 base model are those environmental parameters adversely affected by the first form phases of development activity mentioned above. These parameters are grouped in the categories indicated on the following page.

1975 ENVIRONMENTAL BASE CONDITIONS AFFECTED

	PHASE			
	A ACQUISITION	B RELOCATION	C DISPOSITION	D DEMOLITION
Natural Physical Environment				
1 LAND FORM				
2 BEDROCK GEOLOGY				
3 SURFICIAL GEOMORPHOLOGY		2,3		
4 AIR RESOURCES		2,3		2,3
5 CLIMATE		3		2,3
6 SURFICIAL HYDROLOGY		2,3		2,3
7 SUBSURFACE HYDROLOGY				
8 VEGETATIVE RESOURCES		2,3		3
9 FAUNAL RESOURCES		2,3		2,3
Built Physical Environment				
10 PERCEPTUAL ENVIRONMENT		2,3		2,3
11 LAND USE		1,2		3
12 BUILT CHARACTER		2,3		1,2,3
13 CIRCULATION		1,2,3		1,2,3
14 UTILITIES		1,2,3		1,2,3
Social Political Environment				
15 DEMOGRAPHIC STRUCTURE		1,2,3		3
16 GROUP STRUCTURE		2		
17 POLITICAL STRUCTURE		2,3		
18 FUNCTIONAL SERVICES		1,2,3		1,2,3
Economic Environment				
19 PUBLIC ECONOMIC STRUCTURE	1,2,3	2,3	1,2,3	2,3
20 PRIVATE ECONOMIC STRUCTURE	1,2,3	1,2,3	1,2,3	1,2,3

1 = FIRST ORDER, DIRECT IMPACT
2 = SECOND ORDER, INDIRECT IMPACT
3 = THIRD ORDER, INDIRECT IMPACT

1975 BASE NATURAL PHYSICAL ENVIRONMENT PARAMETERS

The following natural physical environment parameters will be affected during the first four phases of the Park Plaza project development process. Not all of these parameters are detailed in the subsequent 1975 Base description, but only those which have been selected as critical impacts capable of analysis during the Building Study Stage.

SUB COMPONENT/PARAMETER*	STATUS
Surficial Geomorphology:	
N17 Soil depth	Deleted**
N18 Soil Texture	Deleted
Air Resources:	
N22 Air pollutant level	Defer to Design Dev. Stage
N23 Air pollutant type	Defer to Design Dev. Stage
N24 Air odor	Deleted
Climate:	
N25 Air temperature	Deleted
N27 Humidity	Deleted
N28 Snow accumulation	Deleted
N29 Wind direction	Building Study Stage
N30 Wind speed	Building Study Stage
N32 Solar exposure	Building Study Stage
N33 Evaporation/transpiration	Deleted
Surficial Hydrology:	
N38 Flow rate	Deleted
N40 Residence time	Deleted
N41 Temperature	Deleted
N42 Dissolved oxygen	Deleted
N45 Turbidity	Defer to Design Dev. Stage
N46 Biochemical oxygen demand	Deleted
N47 Coliform level	Deleted
N48 Nutrient level	Deleted
N51 Odor Deleted	
Vegetative Resources:	
N64 Quantity (biomass)	Deleted
N65 Community/seres	Deleted
N68 Form Deleted	
N69 Color Deleted	
N73 Condition	Deleted

* NOTE: For a full list of all parameters, see Appendix Report #1. Parameters not listed are not impacted by the Park Plaza project development.

** Parameters are deleted if the impacts are not significant in that they are beneficial, or of negligable change or immeasurable change.

SUB COMPONENT/PARAMETER	STATUS
N74 Uniqueness	Deleted
Faunal Resources:	
N76 Population/density	Deleted
N77 Territorial requirement	Defer to Design Dev. Stage
N78 Habitat	Deleted
N79 Food	Deleted
N80 Residence Duration	Deleted
N81 Condition	Deleted

Criteria for the selection of impact parameters is found in the Appendix Report on the Identification of Potential Environmental Impacts.

NATURAL PHYSICAL ENVIRONMENT

CLIMATE

Base Definition and Significance

The following climate characteristics were considered in this analysis:

- Air temperature
- Precipitation
- Humidity
- Snow accumulation
- Wind speed and direction
- Solar exposure and orientation
- Evaporation/transpiration

These characteristics are interrelated (e.g., as wind and solar exposure affect air temperature and humidity) and these in turn affect pedestrian comfort and the more subjective issues of image. The most critical areas of concern are probably the Common and Garden as areas of unique quality and retail areas on or adjacent to the site. The following pages describe the base wind and solar conditions.

N29 WIND DIRECTION AND SPEED

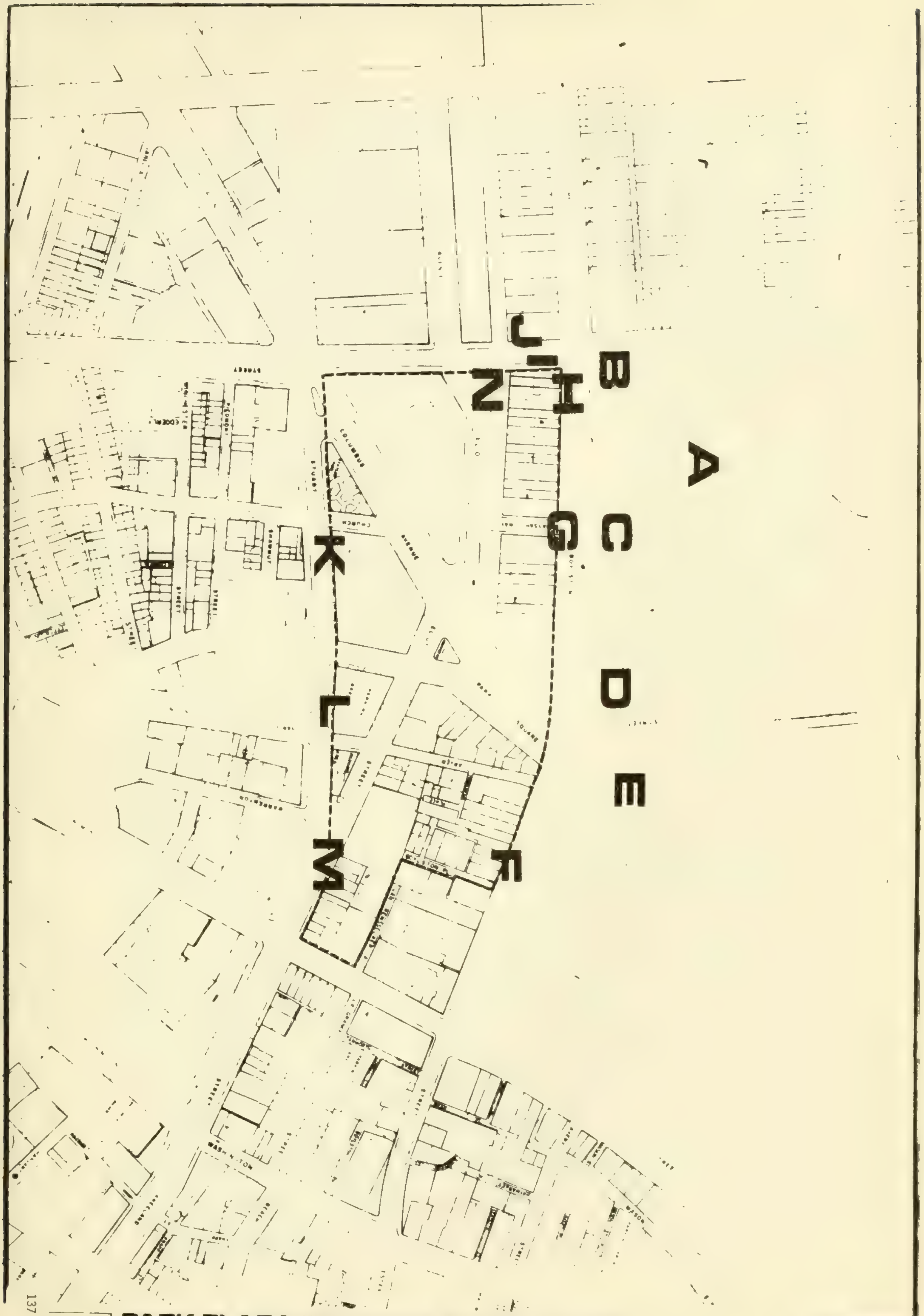
N30

Base Description

Demolition activities would probably result in a period of less wind turbulance on the Common and Garden. Since this would be temporary, beneficial change, the condition created by the existing building represents the appropriate base from which to measure the impact of future development.

A selective study of near ground wind characteristics for the current site development and the six million square foot alternate development program was made by Weather Dynamics, a division of Mt. Auburn Research Associates, Inc. This work employed long range wind data from Logan Airport (corrected for the site condition) and detailed wind tunnel tests. See Appendix.

Insofar as basic assumptions and threshold criteria are concerned, the following page on wind considerations is excerpted from the Weather Dynamics report. The maps and tables on the following pages indicate the points at which wind velocity measurements were



PARK PLAZA BUILDING STUDY STAGE ENVIRONMENTAL IMPACT ANALYSIS

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EBA
WIND
REF

made in the wind tunnel and the distribution of winds by direction (i.e., what percent of winds come from the northeast, etc.) The more subtle characteristics of "gustiness" and calm periods could not be simulated and in any case, related to the specific design phase of the study.

Resource Strengths and Weaknesses

There are no inherent "strengths" or "weaknesses" in the wind conditions.

Thresholds or Limits to Change

For the purposes of describing the threshold(s) of wind characteristics, wind speed and turbulance are appropriate considerations. Since turbulance is not directly predictable at this point, and since the effect of turbulance, in terms of pedestrian comfort and safety, is related to the wind speed, then speed is assumed as the basic threshold measure. It is recommended that the 30 MPH level be assumed as the base "threshold" for this Building Study Stage. As more precise locations of retail and other pedestrian oriented activities are located, during design,

less critical thresholds can be established. As the study indicates, winds over 20 MPH can be assumed in the "damage range", and 30 MPH can be used as a measure of personal danger.[1]

DATA SUMMARY OF PERCENT OCCURRENCE FREQUENCIES FOR WIND SPEED RANGES 0-10, 10-20, AND >20 mph

EXISTING SITE

	mph		
Location	0-10 (%)	10-20 (%)	> 20 (%)
A_1	68.3	25.9	5.8
B_1	81.4	16.3	2.3
C_1	76.0	20.2	3.8
D_1	62.0	31.4	6.6
E_1	68.3	26.3	5.4
F_1	78.3	18.6	3.1
G_1	83.2	14.5	2.3
H_1	83.4	13.0	3.6

	mph		
Location	0-10 (%)	10-20 (%)	> 20 (%)
I_1	89.5	9.4	1.1
J_1	85.0	11.4	3.6
K_1	60.0	29.3	10.7
L_1	65.0	31.1	3.9
M_1	76.4	19.2	4.4
N_1	82.7	14.8	2.5
$(H/I)_1$	81.2	15.2	3.6
NE corner of Boston Co. Bldg.	54.0	34.9	11.1

N32 SOLAR EXPOSURE

Base Description

As with wind conditions, the temporary conditions created by demolition activities may have, or be regarded as, beneficial impacts. So the base condition against which new development should be gauged, is that condition created by existing buildings.

The base condition of solar exposure is the amount of shadow or shade generated by the existing buildings, as expressed by the percentage of available time (daylight) which a given point on the ground will be in shade. Since changes in solar exposure affect pedestrian circulation and vegetative condition and because these related parameters vary by season, seasonal "composites" of base shadows were established. The following page illustrates the total annual shadow pattern of the existing buildings; this work formed the basis for this study and interpretations of the various development programs, as illustrated later in the program. This indicates the distribution of shading by season, in terms of the percentage of a total day. The winter

"day", or time of possible effective sunlight, was from 7:35 AM to 4:25 PM (8-3/4 hours), while the summer "day" was assumed to be from 4:25 AM to 7:35 PM, or 15-1/4 hours - all Standard Times.[2]

Resource Strengths and Weaknesses

Other than the fact that solar exposure changes are permanent and cannot be replace by artificial means, there are no inherent "strengths" or "weaknesses" in this resource.

Thresholds or Limits to Change

Solar exposure does not have an objective threshold except as it relates to vegetative conditions (specifically, the impact full, half and light shade) and to the extent that it affects pedestrian circulation. Both of these parameters will be dealt with in other sections of the study. In terms of these and the more subjective. image-related impact of shading on the Common and Garden, the difference between the base shade conditions and the conditions

created by the new development programs will be assessed in the Testing and Evaluation phase of this report.

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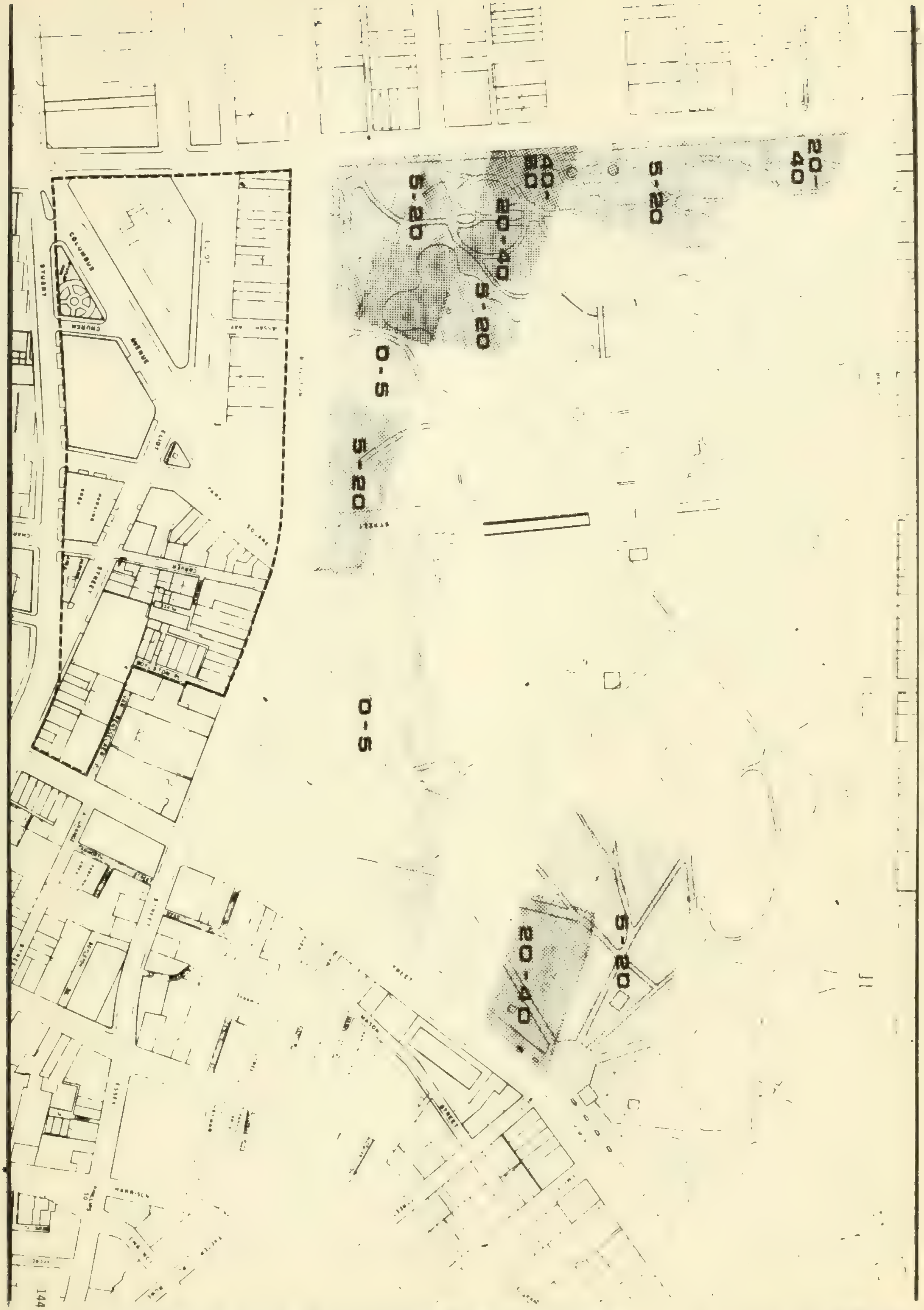
[1] "A Preliminary Wind Effects Study of the Park Plaza Project, Boston, Massachusetts", T. I. McLaren, 25 March 1975.

[2] Time Saver Standards, 5th Edition, page 79.



PARK PLAZA BUILDING STUDY STAGE ENVIRONMENTAL IMPACT ANALYSIS

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DATE:

EBA

o/o SHADOW DIST.
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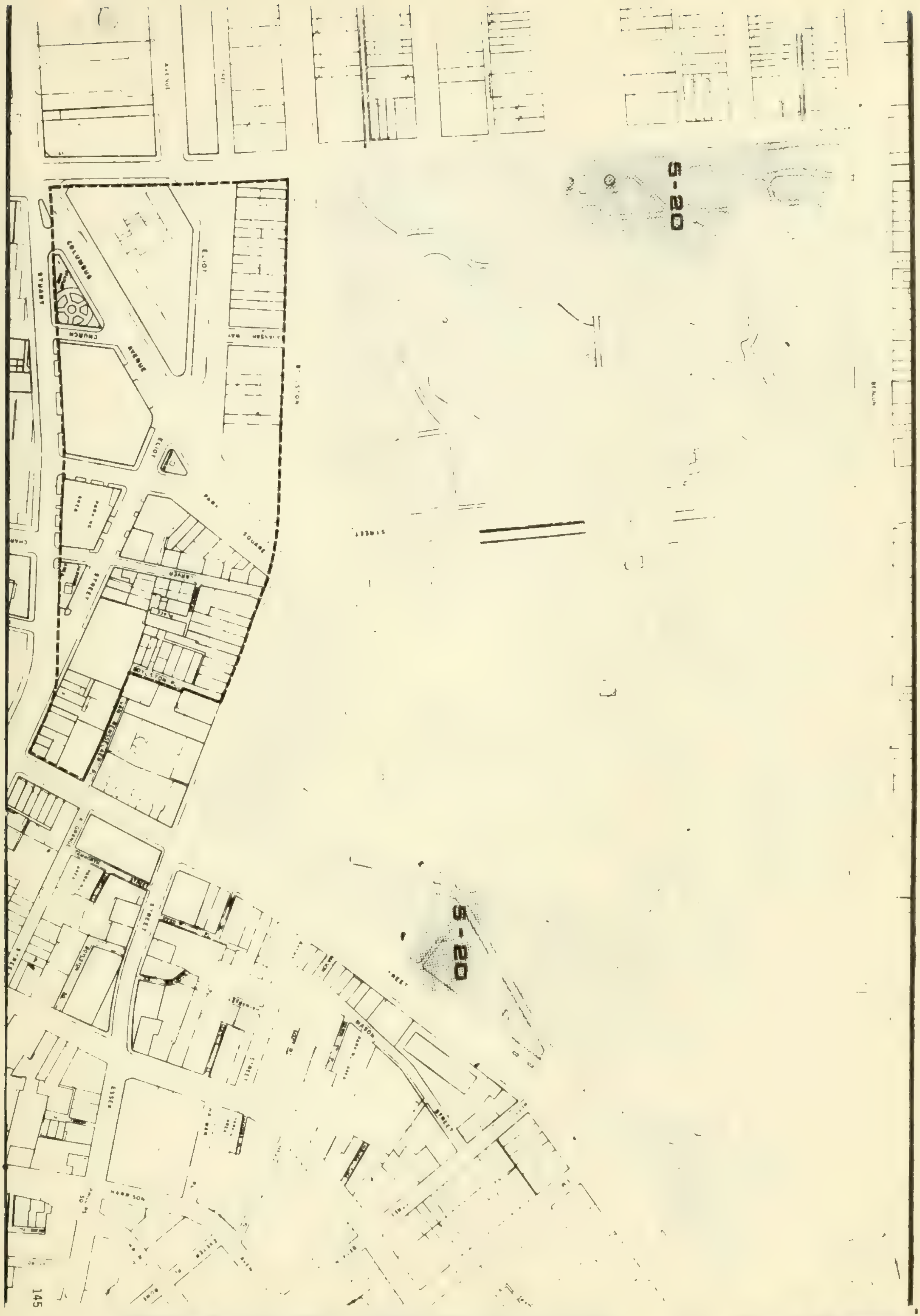

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SUMMER
SOLSTICE
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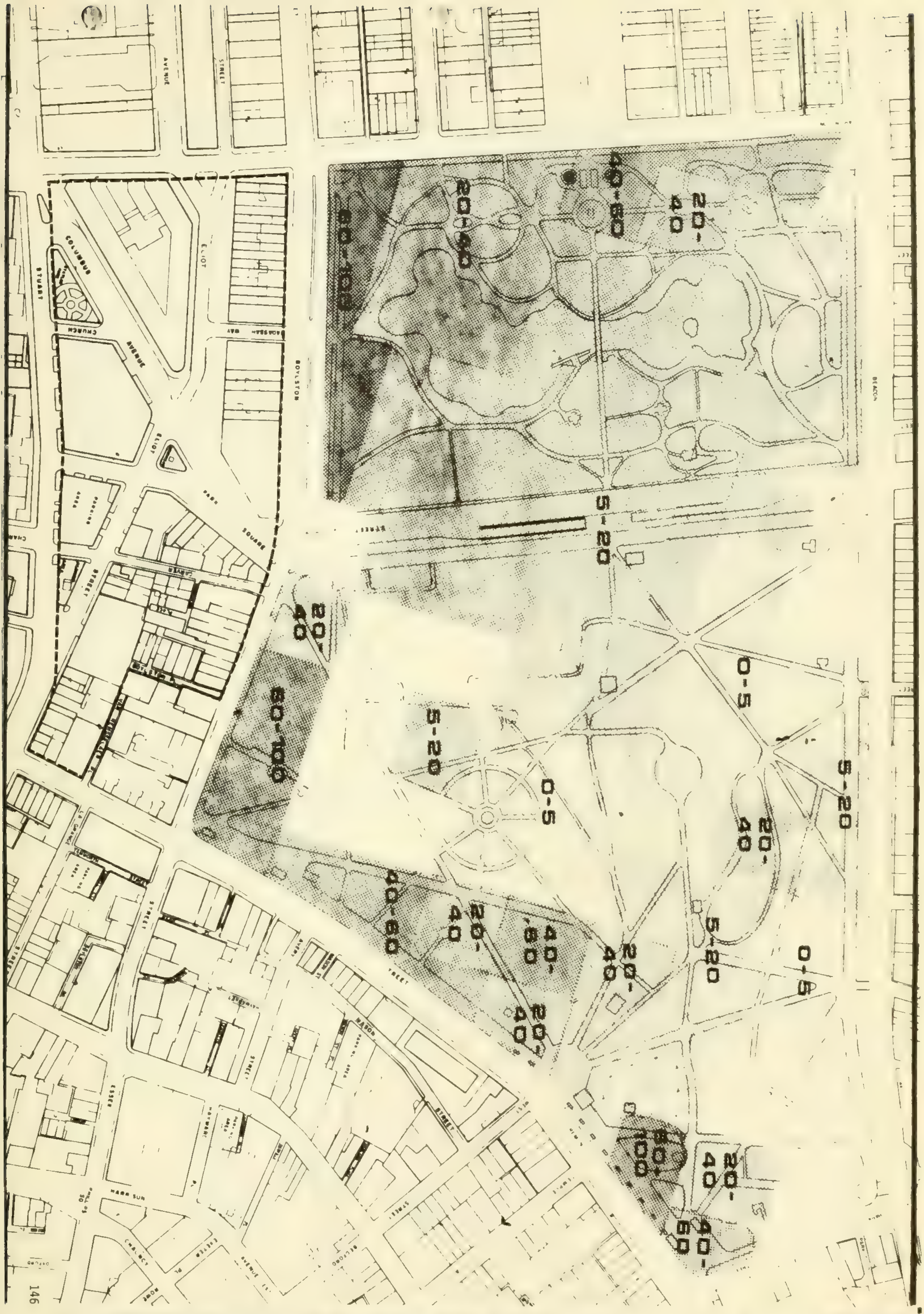

PARK PLAZA BUILDING STUDY STAGE
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DATE:

40 120

EBA
010
SHADOW
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WINTER
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1975 BASE BUILT PHYSICAL ENVIRONMENT PARAMETERS

The following built physical environmental parameters will be affected by the first four phases of the Park Plaza project development process:

SUB COMPONENT/PARAMETER		STATUS
Perceptual Environment:		
B01	Sound level	Defer to Design Dev. Stage
B02	Sound quality	Defer to Design Dev. Stage
B03	Vibration level	Defer to Design Dev. Stage
B04	Vibration quality	Defer to Design Dev. Stage
B05	Scenic vistas	Deleted
Land Use:		
B06	Land use type	Building Study Stage
B07	Land use area	Deleted
B08	Land use distribution	Defer to Design Dev. Stage
Built Character:		
B09	Structural coverage	Building Study Stage
B10	Structural height	Building Study Stage
B11	Floor area	Building Study Stage
B12	Spatial form	Building Study Stage
B13	Visual character (macro scale)	Building Study Stage
B14	Day profile	Building Study Stage
B15	Night profile	Building Study Stage
B16	Visual character (micro scale)	Defer to Design Dev. Stage
B17	Structural condition	Building Study Stage
B18	Site amenities	Deleted
B19	Unique structures	Building Study Stage
B20	Unique quality	Building Study Stage
Circulation:		
B22	Highway system	Building Study Stage
B23	Highway capacity	Building Study Stage
B24	Parking system	Building Study Stage
B25	Parking capacity	Building Study Stage
B26	Service access	Defer to Design Dev. Stage

SUB COMPONENT/PARAMETER		STATUS
B27	Pedestrian system	Building Study Stage
B28	Pedestrian capacity	Defer to Design Dev. Stage
B29	Public transit system	Building Study Stage
B30	Public transit capacity	Building Study Stage
B32	Rail transport capacity	Building Study Stage
B34	Air transport capacity	Deleted
B36	Water transport capacity	Deleted
Utilities:		
B37	Power supply system	Deleted
B38	Power supply capacity	Deleted
B39	Water supply system	Building Study Stage
B40	Water supply capacity	Building Study Stage
B41	High pressure water system	Building Study Stage
B42	High pressure water capacity	Building Study Stage
B43	Fuel supply system	Deleted
B44	Fuel supply capacity	Deleted
B45	Telephone system	Deleted
B46	Telephone capacity	Deleted
B47	Public signal system	Deleted
B48	Public signal capacity	Deleted
B49	Sanitary sewer system	Building Study Stage
B50	Sanitary sewer capacity	Building Study Stage
B51	Storm drain system	Building Study Stage
B52	Storm drain capacity	Building Study Stage

B06 LAND USE TYPE

Base Definition and Significance

The map, "Land Use - 1975" indicates general on-site and adjacent land use types. At the larger scale, the map "Community Areas" indicates the pattern of general land use in Central Boston. Land use includes the major kinds of activities within the on-site and surrounding buildings. The type of land use is one of the major aspects of the Park Plaza area, in terms of its relation to the rest of the downtown, the economic vitality and identity of nearby community areas, including South Cove, Beacon Hill and Back Bay. To the extent that radical land use changes occur in one area, subsequent changes can occur in neighboring areas.

Base Description

The existing site and surrounding area includes mostly a variety of commercial and service uses:

USE	APPROXIMATE LAND AREA*
Commercial	244,281
Retail/Food	(71,808)
Entertainment	(55,641)

Office/Bank	(4,865)
Service	(36,592)
Hotel	(75,375)
Other	
Residential	1,750
Institutional	14,314
Parking	92,786
Vacant	5,586
Other	
Total	358,717

* Does not include streets and walks

Generally, office, service, residential and vacant space characterize the upper levels, with retail and entertainment commercial occupying the most visible street level areas. The photos on the following pages illustrate the street level character of much of the site.

Except for the Piano Row, the Statler, and the car rental establishments, the existing uses do not represent a "link" between two other land use areas, but rather extensions of the commercial area of Washington Street, the "Combat Zone", and residual service needs such as parking lots. In particular, the Park Plaza site area does not function as a major support area to activities in South Cove, Back Bay, the Central Business District or the Common and Garden. Thus, many of the uses on the site are residual in nature, they located

there as a result of minimum choice and expansion of the other areas ("spill-over"), rather than as a conscious effort to establish a pattern of uses which relates to nearby areas.

Resource Strengths and Weaknesses

Land use as an environmental resource of the Park Plaza area is not the result of concerted planning or development strategy, but mostly (exceptions noted above) a relatively haphazard pattern of residual or service activities. One advantage of this is that some on-site land uses could be modified without much disruption of other on-site activities. The relocation of some of these activities into other areas, however, could represent a disruptive effect. This "weakness" of the current set of land uses is described below.

Thresholds or Limits to Change

There are aspects associated with land use changes caused by relocation: 1) what is the potential impact of the existing uses in new areas? 2) what is the residual effect of the vacating of the site?

Relocation Effect

Since there are a number of alternatives where dislocated uses might move, it is not possible to define impacts or impact areas precisely. Further, the _relative_ impact of a particular use moving into an area, as compared to another, can only be _generally_ described, in terms of changing property values, causing further residential shifts and creating other symptoms of instability. Thus, the criteria for assessing the limits to land use changes should be a _relative_ measure which _generally_ associates the nature of the use to its impact upon dissimilar uses. For example, given the same amount of area, offices, hotel and retail can be characterized as having less of a disruptive effect upon other uses than entertainment commercial, in terms of time and activity (day versus night), pedestrian and auto traffic characteristics, and physical appearance (signs, lights, etc.) Office and residential uses can be strongly affected by nearby entertainment uses, often in a negative, disruptive way in terms of property values, image and other aspects. On the other hand, offices and retail activities often represent an increased market for the entertainment uses. Further down the scale, institution and residential uses probably have little or no "negative" or disruptive effect upon relocation. Parking is a special case in that

this activity may be replaced as public street parking or as public or private lots. In terms of possible disruptive effect, parking is a necessary use but can affect residential areas, especially increased street parking. With the assumption that precise relocation areas are not known but that space does exist for the relocation of all uses, the following list characterizes the possible disruptive land use effect caused by relocation activities. It should be noted that the economic aspects of taxes, income, and property values are dealt with separately, in a later section of this report.

General Use Category	Effect
Commercial Entertainment	"Most" disruptive
Office/Retail/Service/ Parking	"Middle"
Institutional/Residential	"Least"

As discussed above, an absolute limit to land use change cannot be quantified, but a relative level of land use impact can be used to describe the various relocation patterns of the development alternatives.

Residual Effect

Another key question associated with relocation is the residual effect; what is left over after relocation occurs, for how long are buildings and sites vacant, and what is the overall nature of land use activities in the Park Plaza site during the pre-construction period? In that the site uses for the most part have no traditional link with adjacent areas, but are more in the nature of "spill-over" uses (e.g., from Combat Zone) or the result of *individual* decisions (e.g., Seamans Union, Piano Row), by the separate business interests involved, there is little *dependency* of the *adjacent* areas upon the land uses in the Park Plaza *except in terms of bus terminal, car rental, and parking needs*. Thus the land use impact associated with the site area is more a function of the amount of time the site is vacated rather than the loss of positive land use connections with adjacent areas; if the site is vacated for a number of years, the absence of uses may begin to have as much effect as the uses that exist today. Thus, the residual land use effect is also a relative measure which can be characterized for each relocation pattern, by estimating the amount of time land is left in a vacated state for each development program.

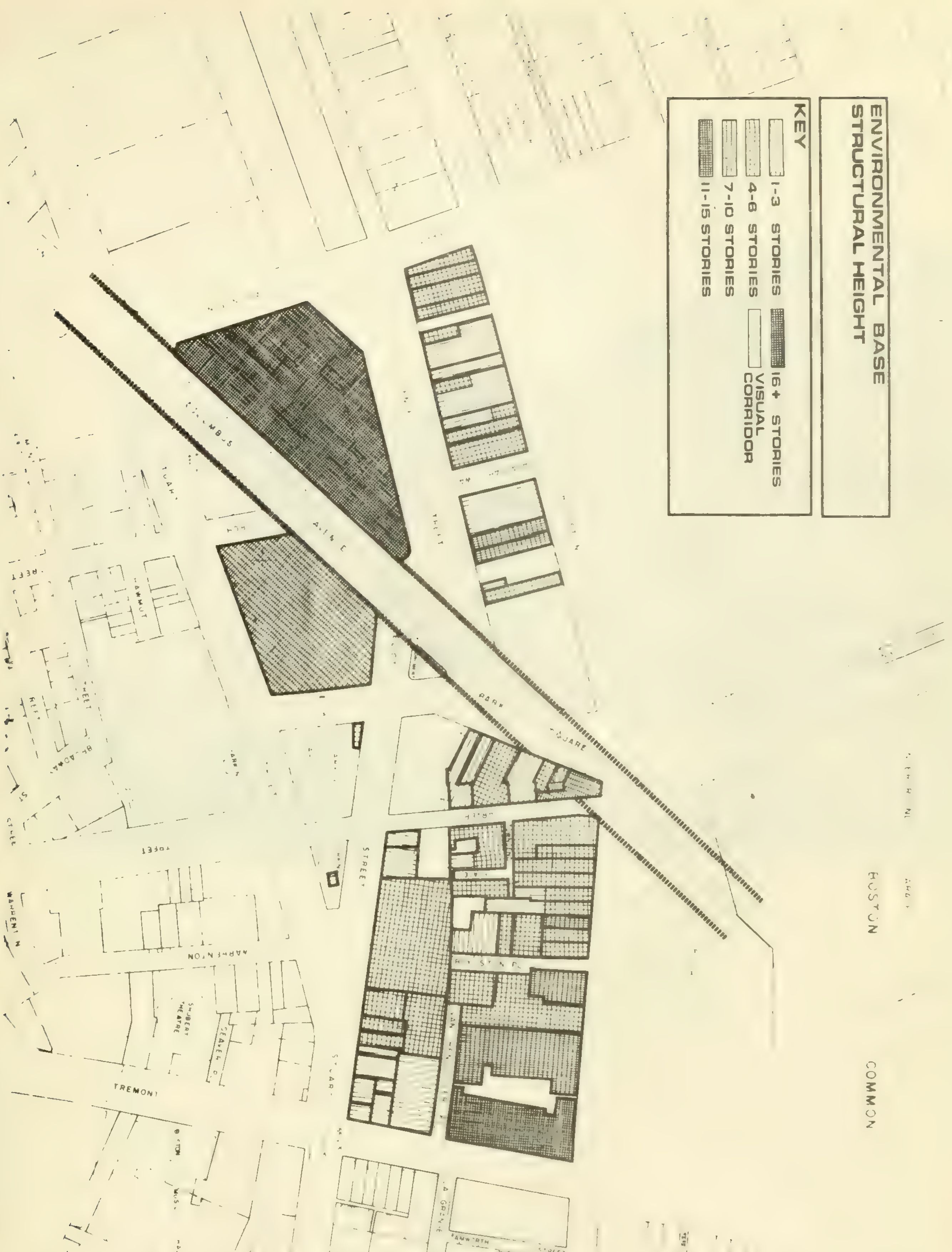
BUILT CHARACTER

B09 STRUCTURAL COVERAGE

B10 STRUCTURAL HEIGHT

Base Definition and Significance

The height of buildings and the relative amount of land they cover is a major aspect of physical character, especially in terms of the pedestrian image of the area. As can be seen by the map "Structural Height" and the photographs on the following pages, the coverage and height of existing structures typifies urban sites which have a variety of transitional uses and which are located in the midst of major community areas. Rather than composed of row structures of uniform height with an occasional yard, as is the case on Arlington and Beacon Streets and in Bay Village, the Park Plaza site has more variety of form, a more "abrupt" pattern of vacant lots and commerçial buildings. This character is somewhat less imposing than the more urban, Tremont Street edge.



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DATE

bachelors III
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CARL FISCHER
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Resource Strengths and Weaknesses

The general building scale of existing development, if not the total character, is similar to nearby areas, especially in terms of the Boylston Street facade. Further, although there is not planned pattern to the existing arrangement of buildings and spaces, at least the site is not totally covered by buildings, as is common with many urban areas.

Thresholds or Limits to Change

The limits to changes in building height and coverage are not specific quantities, except as specified in the urban renewal plan.

B11 FLOOR AREA

Base Definition and Significance

Floor area is the amount of floor space (in square feet) in on-site structures. The building area is a general indicator of the level of activity in an area.

Base Description

The amount of floor area on the site is typical of the level of site development for transitional urban areas, areas which accommodate service activities and uses which spill over from nearby areas. The amounts of floor area for each major land use category are listed in the land use section.

Resource Strengths and Weaknesses

There are no inherent "strengths" or weaknesses" in the floor area characteristics of the site.

Thresholds or Limits to Change

There are no specified criteria for floor area per se, except as it relates to the impacts created by vacant buildings (police and fire protection). As vacated buildings are demolished, the potential police and fire protection problems decrease, so the key aspect is how long vacant buildings will remain standing. If the impacts on police and fire protection represent permanent changes, e.g., changes in the police and fire systems, a threshold has been reached.

B12 SPATIAL FORM

Base Definition and Significance

The spatial form of the Park Plaza is the overall form of exterior spaces created by the existing buildings on the Park Plaza site and buildings and vegetative cover facing the site from the surrounding area. In terms of physical characteristics, the spatial form of the site is a limited feature, as described below.

Base Description

The amount and plan shape of existing outdoor spaces can be seen on the map, "Structural Height". Except for the visual corridor of Columbus Avenue and the Boylston Street frontage on the Common and Garden, most of the exterior spaces are residual in nature, i.e., they are not the result of large scale plans, but left-over areas from building development. The photographs on the following pages illustrate the Boylston Street and Columbus Avenue corridors and some of the residual spaces on and adjacent to the site.

Resource Strengths and Weaknesses

The Boylston Street and Columbus Avenue corridors are part of an overall downtown and regional pattern. They are major travel corridors and converge near the center of the metropolitan area. Further, as illustrated on the "Unique Quality" map, these elements are related to the historic fabric of the city, forming the edge to the Common and Garden, both National Register Sites, and form part of the overall setting of the historic districts of Back Bay and Beacon Hill. Further, two other National Register sites, the Arlington Street Church and the Columbus Avenue Armory, are directly adjacent to these sites. Finally, the Columbus Avenue corridor represents a visual reference, directly focusing on the Park Street Church, also a National Register site.

So, the Park Plaza site possesses only a few major reference features, but they form strong relationships with nearly important urban elements and are part of an overall transportation pattern for Boston.

B13 VISUAL CHARACTER

Base Definition and Significance

Visual Character is the form and texture of the buildings, including the overall form created by connected buildings. The visual form of the existing buildings is described and illustrated in the Sections, "Structural Coverage and Structural Height", "Day Profile", "Night Profile" and "Unique Structures". The "texture" of building elements is described below, in terms of the type and use of various building materials.

Base Description

The photos on the previous pages illustrate the prevalent masonry materials, with commercial storefronts and signs at the street level. Although the numerous signs and other commercial elements present a relatively chaotic pedestrian environment, the basic mansory construction represents a rich visual element of the Park Plaza area. The residential structures of Bay Village, Back Bay and Beacon Hill are also masonry and form much of

the visual character of the community which focuses on the Common and Garden.

Resource Strengths and Weaknesses

The visual texture of the Park Plaza structures is a strong element of site character, but many of the buildings are structurally substandard. In terms of *quantifying* the visual texture of the Park Plaza site, however, it should be remembered that, while historic buildings and facades cannot be replaced, new development *could* improve upon the visual character of other sites, given a sensitive design approach. Thus, the test for environmental change for those structures which are *not* regarded as historically significant must be deferred until the design stage. Meanwhile, the effect of various demolition patterns on the group of historic structures can be regarded as the change in visual texture for the building study stage. Obviously, no *precise* measure of value of these structures can be developed, but the *relative* impact of the development programs can be "measured" in terms of the number of buildings demolished.

Currently, the Park Plaza site contribution to the area is represented by two basic characteristics.

Facade character and scale - some historic structures, some similarity to other park edges (materials, relief).

Building height - facade and building height through the site in terms of "macro-visual" scale and day profile.

Building height is a program generated (and design manipulated) characteristic, while facade character is essentially a matter of preservation, since the new project would not include duplication of existing facades. Thus, the threshold criteria for facades is whether they are retained or not. On the other hand, the threshold criteria for building height would be a relative measure; to the extent that the average building height and the distribution of facade heights along street fronts represent a positive aspect of the unique quality of the environs, any deviance from those characteristics could be described in relative terms.

In conclusion, since neither facade character nor building

height can be assigned an absolute, objective threshold or unit of change, the existing conditions can be regarded as a "threshold", and all subsequent changes "measured" from there, ultimately seen as permanent changes in the unique quality of the area.

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[1] BRA, "Building Conditions Report", 5/73.

[2] C.T. Main, "Building Deficiencies Report - Park Plaza - Stage 1", 4/73.

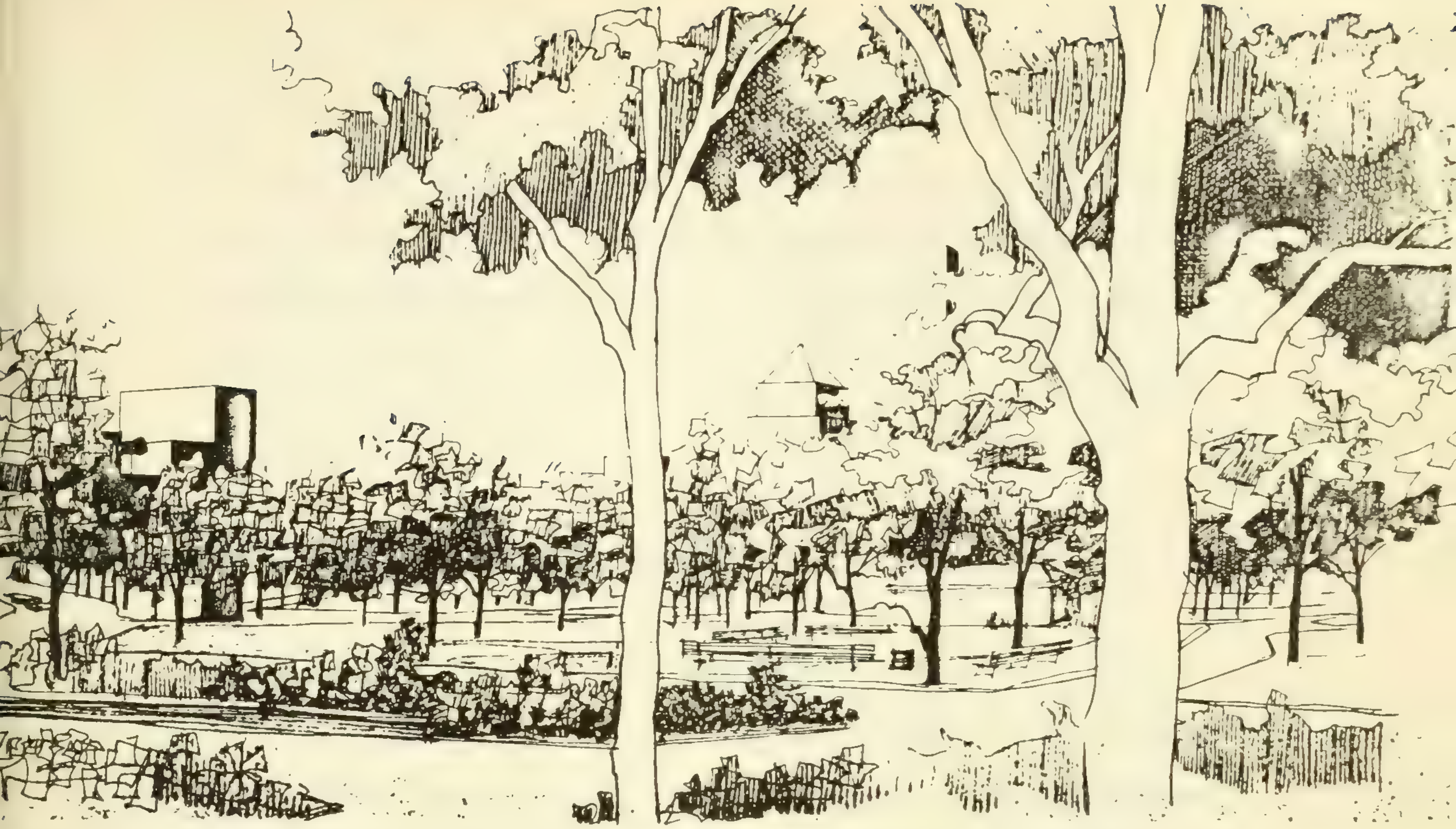
B14 DAY PROFILE

Base Definition and Significance

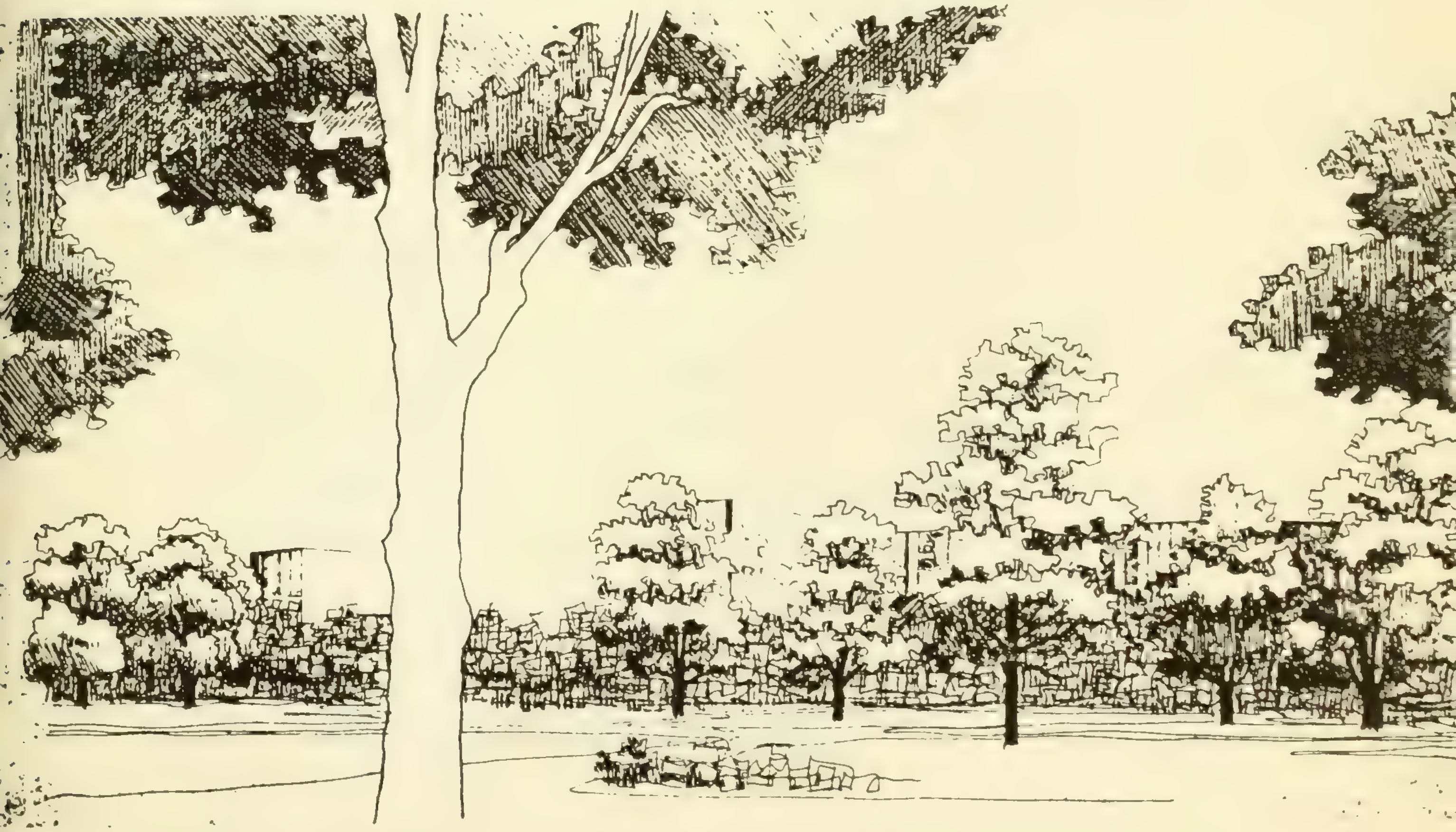
Day profile is the general silhouette of the buildings during the daylight hours. This profile is a major aspect of the site today, particularly as it relates to adjacent major open spaces, the Common and Garden and the surrounding residential areas of Bay Village, Beacon Hill and Back Bay. Major open spaces can appear as enclaves of green space if surrounding buildings are high-rise (e.g., Central Park, New York City), or an open space may visually integrate with its surroundings through the existence of surrounding buildings which are low-rise, "pedestrian" scale.

Existing Base Condition

The existing structures on the Park Plaza site are mostly low-rise, i.e., between two and six floors, with few exceptions, as can be seen in the Structural Height map. From prominent pedestrian areas ("visually sensitive points"), even the low-rise structures are mostly obscured by foliage during the Spring and Summer, as can be



BASE - VIEW FROM NEAR PARK ST. CHURCH (MAJOR TRANSIT, FREEDOM TRAIL)



BASE - VIEW FROM NEAR ARLINGTON AND BEACON STREETS

seen in the views on the previous page. Even when it can be seen, the Boylston front is not a wall, in the sense that there are a number of vacant lots and severe changes in building height along the street. The other street fronts also vary in height.

Resource Strengths and Weaknesses

The current day profile of the Park Plaza site is a low-rise, pedestrian-scaled aspect of the site; it does not represent a high edge or "wall" to the Common and Garden. It is important to note that there are no high-rise structures which block the view of the sky; the low-rise character is not only a street front characteristic, but an aspect of overall character.

Thresholds or Limits to Change

There are no specific documents limits to day profile. The cornice height limit of 125 feet as specified in the urban renewal plan does not affect day profile but only street facade height. Consequently, the existing condition is regarded as the "threshold", with all changes caused by new development to be seen as relative departures from the existing condition.

B15 NIGHT PROFILE

Base Definition and Significance

The base condition for night profile is represented by night skyline views of the project as they exist today. Much of the image which urban areas have is based on the skyline view; the vitality, scale and "health" of the city has been traditionally associated with skyline. Although such perceptions are highly simplistic at best, and usually misleading, there is a potential for this image-making characteristic to change significantly by new development of the Park Plaza site.

Another form of night profile is the aspect of street level evening use and illumination, often represented by the presence of "entertainment" commercial uses. Although the value of these uses (bars, lounges, adult book stores, etc.) as an appropriate measure of Boston's vitality is obviously a matter of subjective judgment, the level of streel illumination does serve as a reference to the need for police services and other demands. As properties become vacated, the street becomes deserted at night, increasing the potential necessity for police surveillance.

Base Description

Since there are no buildings over 15 floors, no long distance views exist (e.g., from Cambridge). Many of the buildings are characterized by relatively inactive office and storage space on upper floors, and active commercial uses on first and second levels. The "Land Use 1975 - Night Profile Reference" map (see land use section above) indicates the extent of on-site commercial use activity during the evening hours. As indicated on the map, almost every street around and within the site has some evening commercial activity.

Resource Strengths and Weaknesses

Night profile, as a site characteristic, has no inherent strengths and weaknesses.

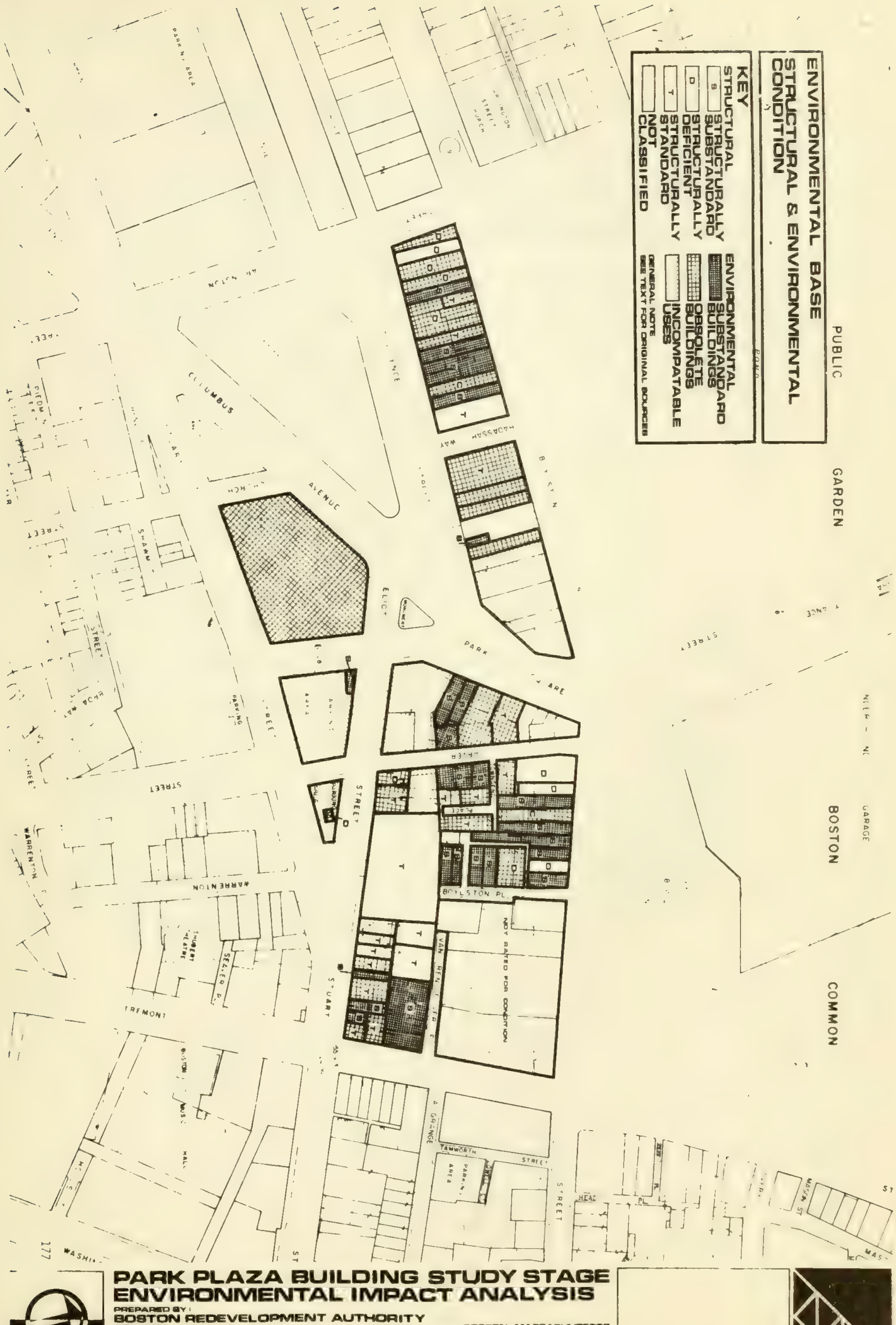
Thresholds or Limits to Change

One basic limit to a change in night profile is the level of reduced street illumination at which increased police services or patrols are needed. This applies to both the changes which occur during construction and as a result of the final project.

B17 STRUCTURAL CONDITION

Base Description

In 1973, two studies describing structural and environmental conditions were made available.[1] These conditions are summarized and mapped on the plan "Structural and Environmental Condition." As can be seen on the map, a number of structures were judged as structurally or environmentally substandard. Generally, these are older structures which have been subjected to a variety of uses.



PARK PLAZA BUILDING STUDY STAGE
ENVIRONMENTAL IMPACT ANALYSIS

PREPARED BY:
BOSTON REDEVELOPMENT AUTHORITY
CITY HALL BOSTON, MASSACHUSETTS
THE SARATOGA ASSOCIATES
BRISTOL, LITYNSKI, WOJCIK, TARBOX, HOLLISTER, CINGUINO, AND MOORE PC
THE ARCADE SARATOGA SPRINGS, NEW YORK
DATE:

Resource Strengths and Weaknesses

Some of the structures on the site can be rehabilitated, from an architectural viewpoint, aside from economic feasibility. However, there is no efficient grouping of such structures to allow for efficient site planning, nor any strong corrleation between architecturally significant structures (see "Unique Structures" map) and the pattern of buildings that could be rehabilitated.

Thresholds or Limits to Change

The urban renewal plan does not specify the minimum number of structures to be razed or rehabilitated, and no other objective limit is available; the existing aggregate condition of the Park Plaza building should be regarded as the threshold, in the sense that the current proportion of "substandard" and other negative condition (as indicated in the list above) should not increase as a result of demolition activities.

B19 UNIQUE STRUCTURES

B20 UNIQUE QUALITY

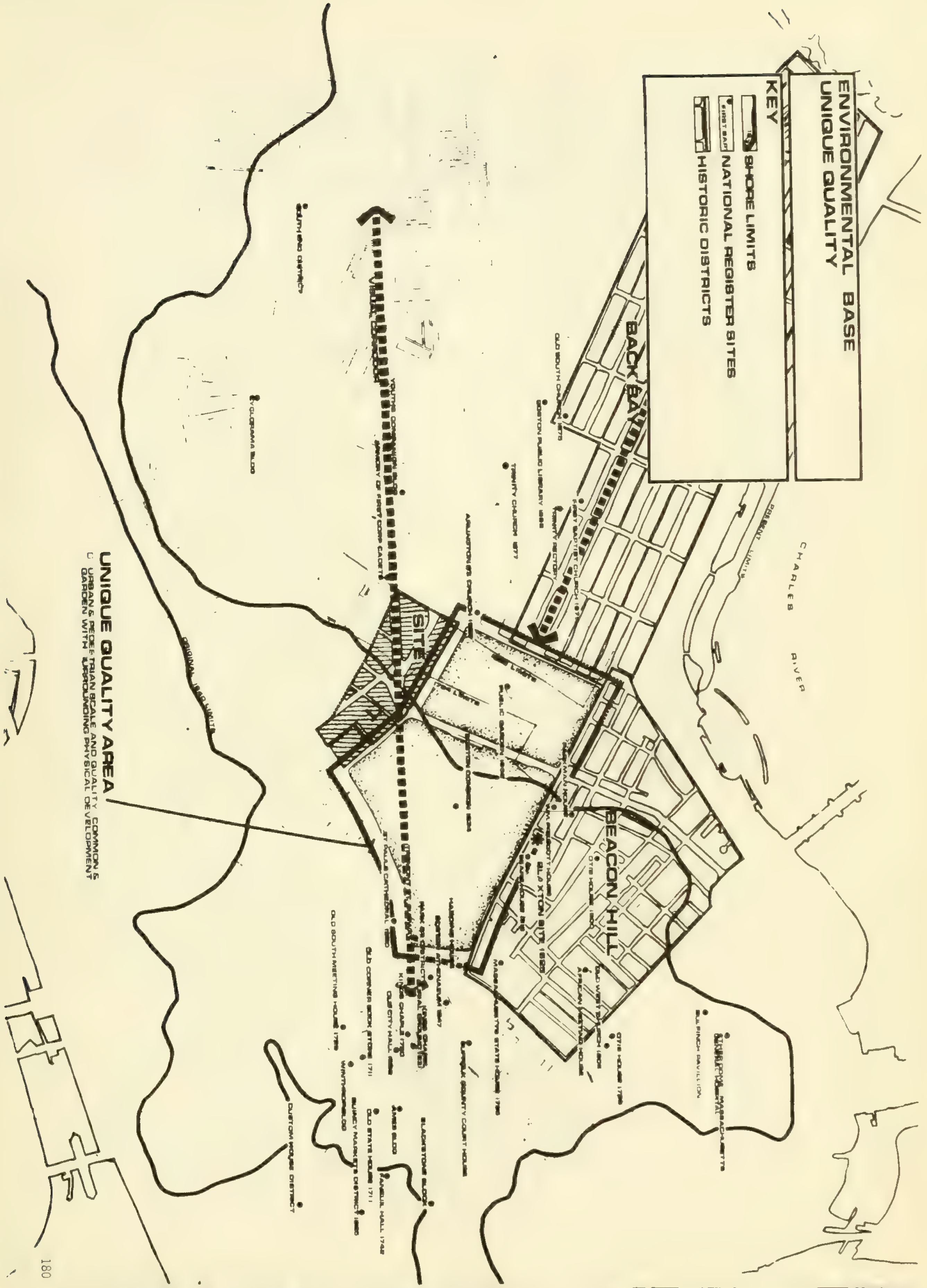
Base Definition and Significance

The term, "Unique Quality" refers to the aggregate character of the site and surrounding area, in terms of the prevelence and prominence of individual historic sites. This portion of the report deals with the "buildings of merit" and areas of unique quality on the Park Plaza site. The numbers in parentheses below are the reference numbers for designated structures on the "Structural and Environmental Condition" map.

The Park Plaza site, as indicated on the "Unique Quality" map, is bordered by Arlington, Boylston, Stuart and Tremont Streets. The Boston Common and Public Garden also border the Park Square area to the north on Boylston Street.

Base Description

Park Square occupies approximately two-thirds of the



PARK PLAZA BUILDING STUDY STAGE ENVIRONMENTAL IMPACT ANALYSIS

PREPARED BY

BOSTON REDEVELOPMENT AUTHORITY
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THE ARCADE
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neck of the Shawmut Peninsula (see 1"=200' Unique Quality Map). This was the extent of "Colonial Boston", just north of the isthmus which connected the mainland with the peninsula.[3]

A few streets still remain today from the early 18th century period as depicted on the Bonner Map 1769:

Boylston Street - originally Frog Lane
Harrison Avenue - originally Ranford Lane
Essex and Beach Streets - still remain[4]

A unique historic feature not found on any map is the "Liberty Tree" - a giant elm under which the sons of liberty met. This elm was felled by the British in 1775. A plaque was attached to the wall of 630 Washington Street in 1865 near the historic site.[5]

There is no information as to what structures were built in this area during the colonial period except for the fact that they were residential.

Several streets came into being as shown on the 1814 Hales Map--Carver and Eliot Streets, Park Square, and Common Street, now called Tremont Street.[6]

Structures of historic significance in the Park Square are from the post colonial period (1814 cc). The "Structural and Environmental Condition" map shows three brick row houses which are still standing at the present 12-16 Carver Street address. (17)(18)(19)

The 1794 shore limits as shown on the Unique Quality 1" = 200') map developed as the townspeople granted the marshy flats at the foot of the Common for the erection of buildings to replace the rope walks that were destroyed by fire on the other side of town.[7]

The 1835 shore limits as shown on the same map were established when Boston and Providence Railroad Line built its depot where the Statler Building now exists. This railroad crossed the Back Bay area into Roxbury.[8]

Upon expansion of the shore limits, development began along Boylston Street during the 1840's. Greek Revival row houses were built of which only three structures remain today. (8) These structures are occupied by the Women's Educational and Industrial Union. In the same time frame (1839 to 1855) the Public Garden was completed.

The whole character of the site was altered between 1875 and 1900. The residential neighborhood gave way to commercial and industrial structures replacing Greek Revival row houses of the 1840's. Contemporary examples include:

Young Men's Christian Union - 1875
Hayden Building - 1875
Felmers Boylston Building - 1887[9]

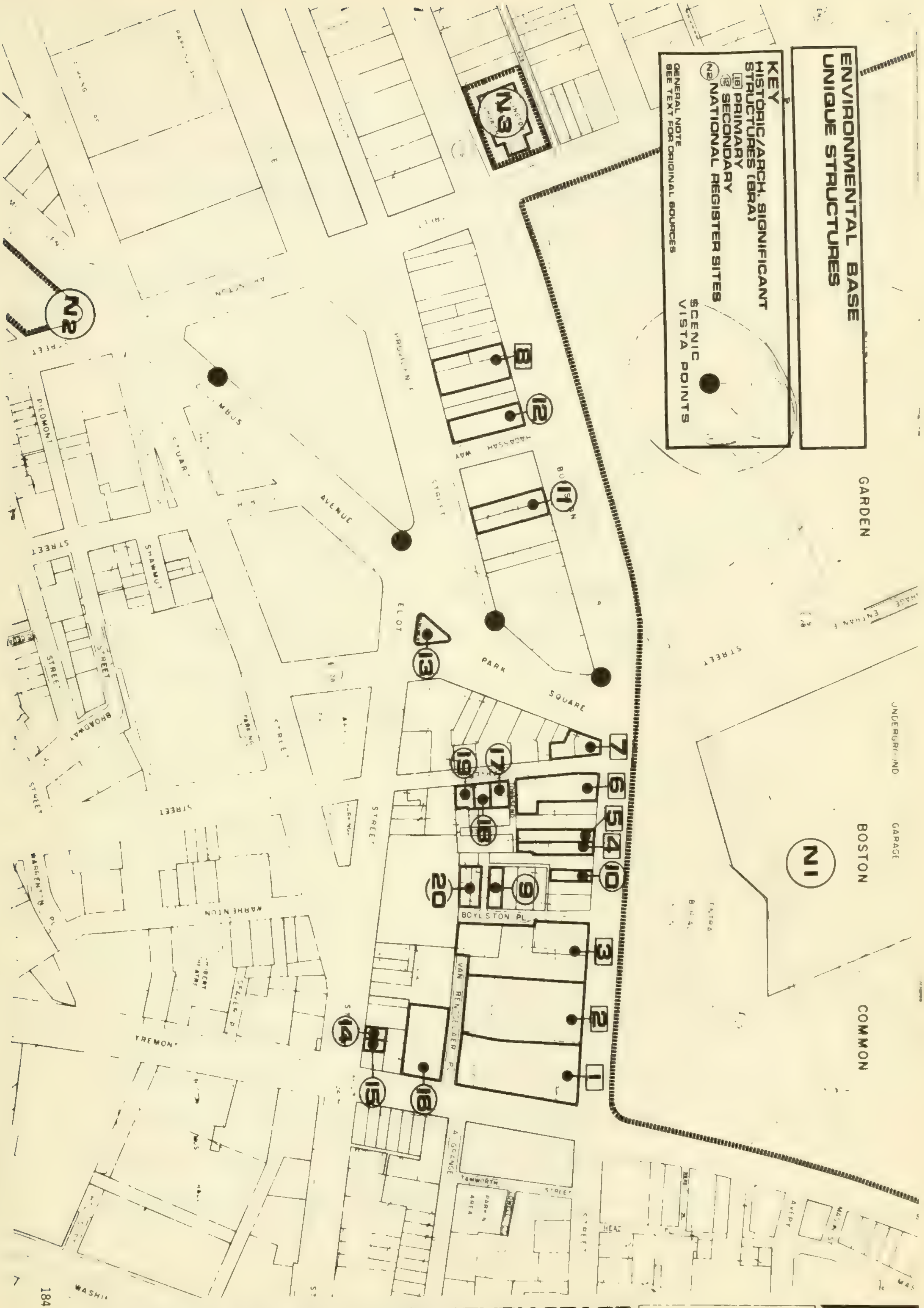
The Emancipation sculpture was dedicated to the City in 1879. (6) This monument is a duplicate of the Freedman's Memorial in Lincoln Square, Washington, D.C.

By 1890, the large scale commercial buildings were constructed continuing into the present century, including:

Walker Building - 1901 (3)
Little Building - 1915-18[10] (1)

With the construction of the insurance company and new office buildings south of Park Square and Clark Street Extension, the western section of the site became an inportant business district and the residential architecture had all but vanished.

Some of these old nineteenth century structures gave way



ENVIRONMENTAL BASE
UNIQUE STRUCTURES

PARK PLAZA BUILDING STUDY STAGE ENVIRONMENTAL IMPACT ANALYSIS

PREPARED BY
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SARATOGA SPRINGS, NEW YORK
DATE:

to parking lots, rent-a-car companies, and bus terminals; much of what has replaced the historic setting is now considered a negative environmental condition.

Resource Weaknesses

Condition

The most obvious disadvantage the historic structures have is probably their physical deterioration. Although a basic philosophy of historic preservation is that the land area by itself can be dedicated (e.g. the original site of the Boston Massacre), it is usually a structure which represents, to most people, the vessel of historic value.

Identity

Perhaps due to the intrusion of some transitional commercial uses (e.g. parking lots) and the relatively low level of physical conditions in the area, the historic structures and areas of unique quality in the site area do not constitute a setting or district, even in an unofficial sense. This is a critical weakness, in that such districts usually represent more than the sum of

the individual "landmarks", in terms of public support and accommodation. So in addition to basic problems of physical condition, there is the related problem of area identity. As described below there are a few areas where facades tie together.

Recognition

Another disadvantage which the on-site historic sites have is that they have not been included on the National Register, so that often, more prominent sites and districts in Boston predominate. In many cities where only a few older buildings exist, such differences may represent little variation in terms of public concern and attention. In Boston, however, where hundreds of older, useful structures exist, they suffer the competition of registered sites and strong economic redevelopment forces.

Resource Strengths

Setting

One of the most obvious strengths of the Park Plaza site in terms of its unique quality is its general setting

with the Boston Common and Public Garden - a landmark on the National Register.

The landmark forms an edge with two of the most prominent residential areas in the nation - Beacon Hill and Back Bay. The edges of these areas which border on the Common and Public Garden, combined with the facades of similar historic structures along Boylston Street help establish the unique pedestrian scale and character of Boston Common and Garden area. The undulating character of the street fronts, varying building heights and rusticated masonry are the physical elements which make up this unique character.

Variety

The historic variety is also a positive aspect or resource strength found in the structures of Park Plaza. Two historic architectural periods are represented - early and late nineteenth century types.

The Women's Educational and Industrian Union (8) is a group of Greek Revival town houses, representing the only existing examples of 1840 architecture along Boylston St.

Large scale commercial architecture took prominence in the late nineteenth century of which some important structures still remain and are worth noting. These include:

Boylston Piano Row (4)(5)(6)(7)
Walker Building - 1891 (3)
Colonial Building - 1899 (2), as examples.

As Park Plaza site became commercialized, the largest structures surrounding the Common evolved. The Walker Building which is the largest, is about 120 feet in height.

Thresholds and Limits to Change

In terms of establishing objective limits to environmental changes, the resource strengths of setting, variety, and scale (see section on Structural Height/Coverage) are key inputs.

To the extent that the Park Plaza site's contribution to the unique quality of the Boston Common and Garden can be preserved, the environmental "limit", in terms of unique quality, is not exceeded.

Circulation

Base Definition and Significance - B22, 23, 24, 25, 27, 29, 30, 32

Travel to and from Park Plaza will be from the site area itself, from other portions of the downtown area, or from one of the six major access corridors defined in Figure II-2. These corridors correspond with major highway, rail transit, and commuter rail routes serving the Park Plaza site and have been used as the basis for almost all transportation studies conducted in recent years in the Boston region. As displayed in Part V, data are available giving the relative distribution of both employee and non-employee trips generated by each of these six corridors. In addition, historical modal split data are available by corridor so that actual trip making behavior can be more closely approximated than if region-wide figures were used.

Park Plaza trips that are internal to the site area itself, e.g. trips from an apartment complex to an office tower, are assumed to be an internal pedestrian movement and are not considered as part of this analysis.

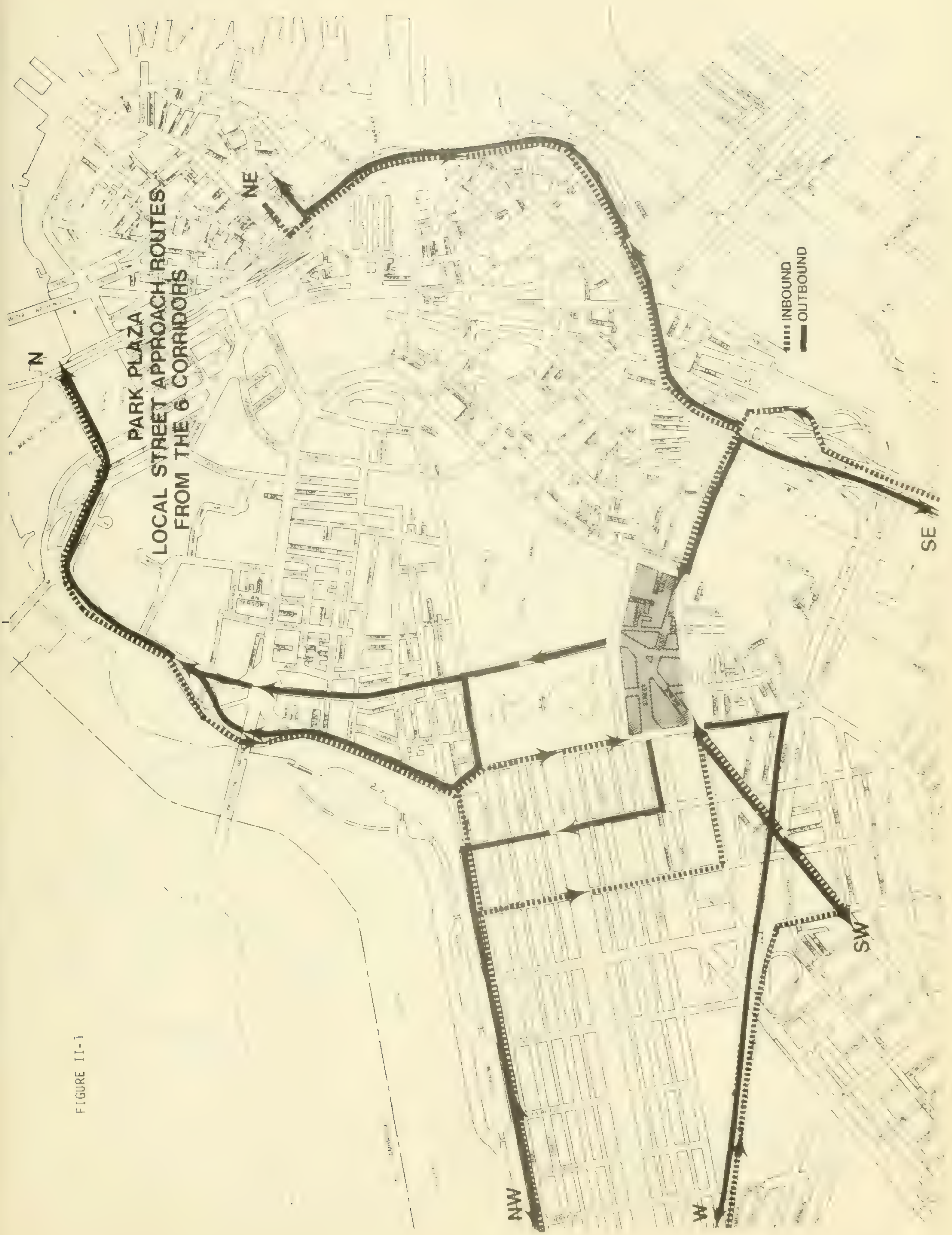
Trips between Park Plaza and other parts of the downtown region are assumed to be either pedestrian or rapid transit. For convenience, all transit travel of this type is assumed to use the Green Line.

For trips from outside the downtown area, street, rapid transit, and commuter rail routings can be defined for each of the six defined access corridors. One or at most two specific routings are defined for each mode for each corridor. In reality, more options are available to an individual traveler, and will be used. However, this approximation was made to help focus the analysis on the indentification of the most severe impact areas.

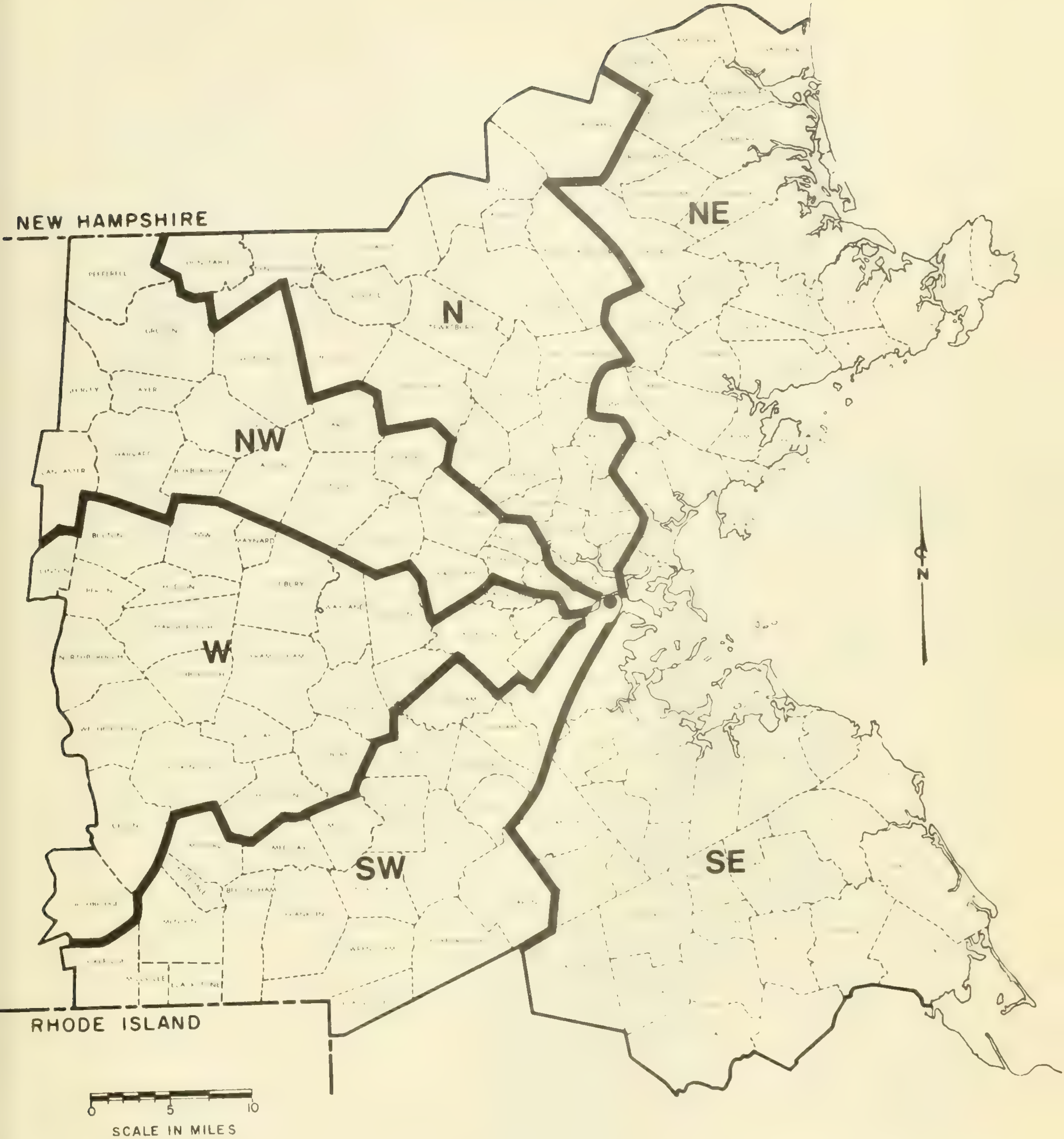
Principal inbound and outbound highway routes serving Park Plaza are defined in Figure II-3 and II-4. The following assumptions are made:

- northeast corridor traffic will use the Sumner/Callahan Tunnels and Stuart/Kneeland Streets.
- north corridor traffice will utilize I-93 and Storrow Drive. Entrance will be by Beacon Street and then either Arlington or Clarendon Streets to Stuart Street. Exit will be by Charles Street and Storrow Drive.

FIGURE II-1



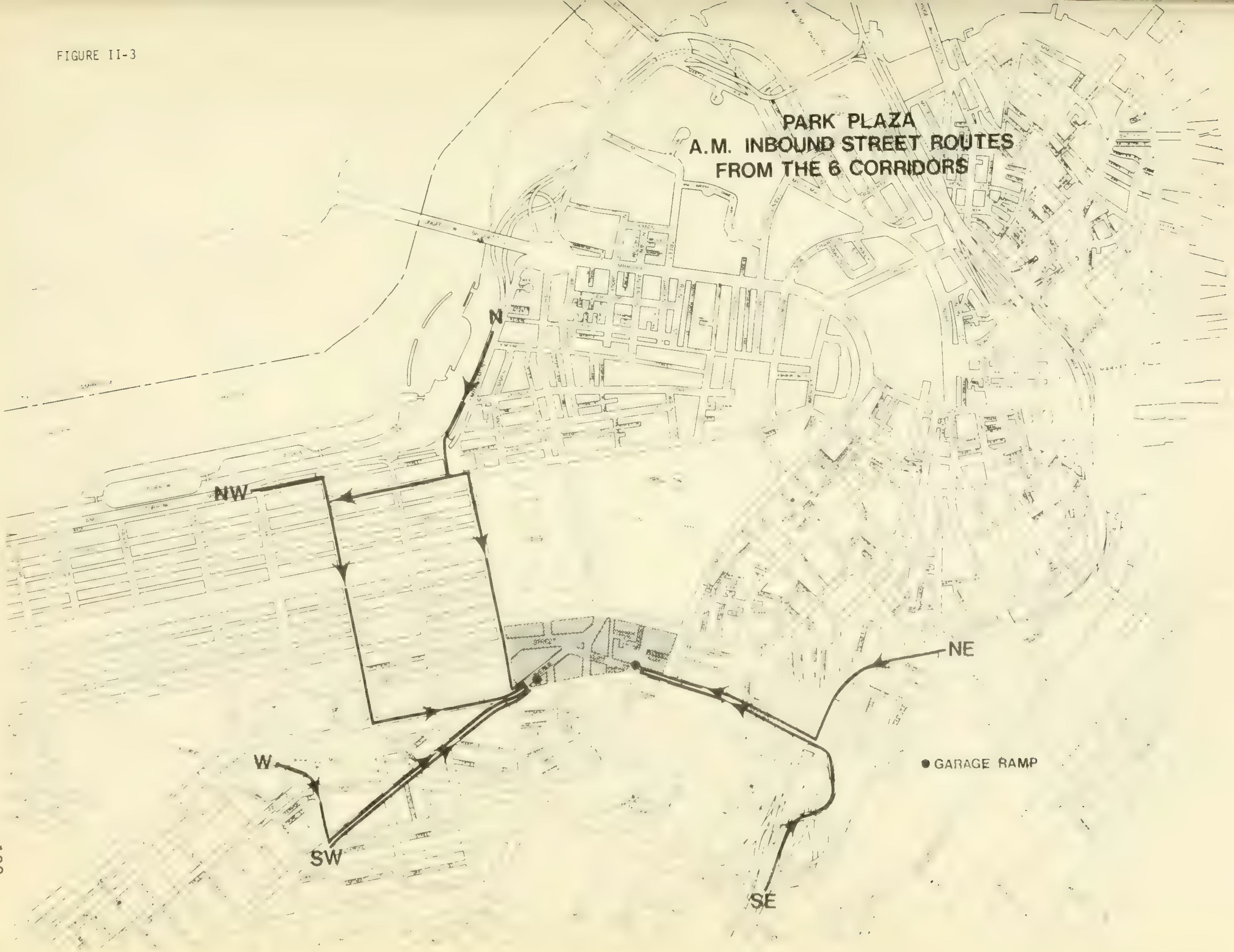
PARK PLAZA
LOCAL STREET APPROACH ROUTES
FROM THE 6 CORRIDORS



SIX CORRIDORS USED FOR TRAVEL TO PARK PLAZA

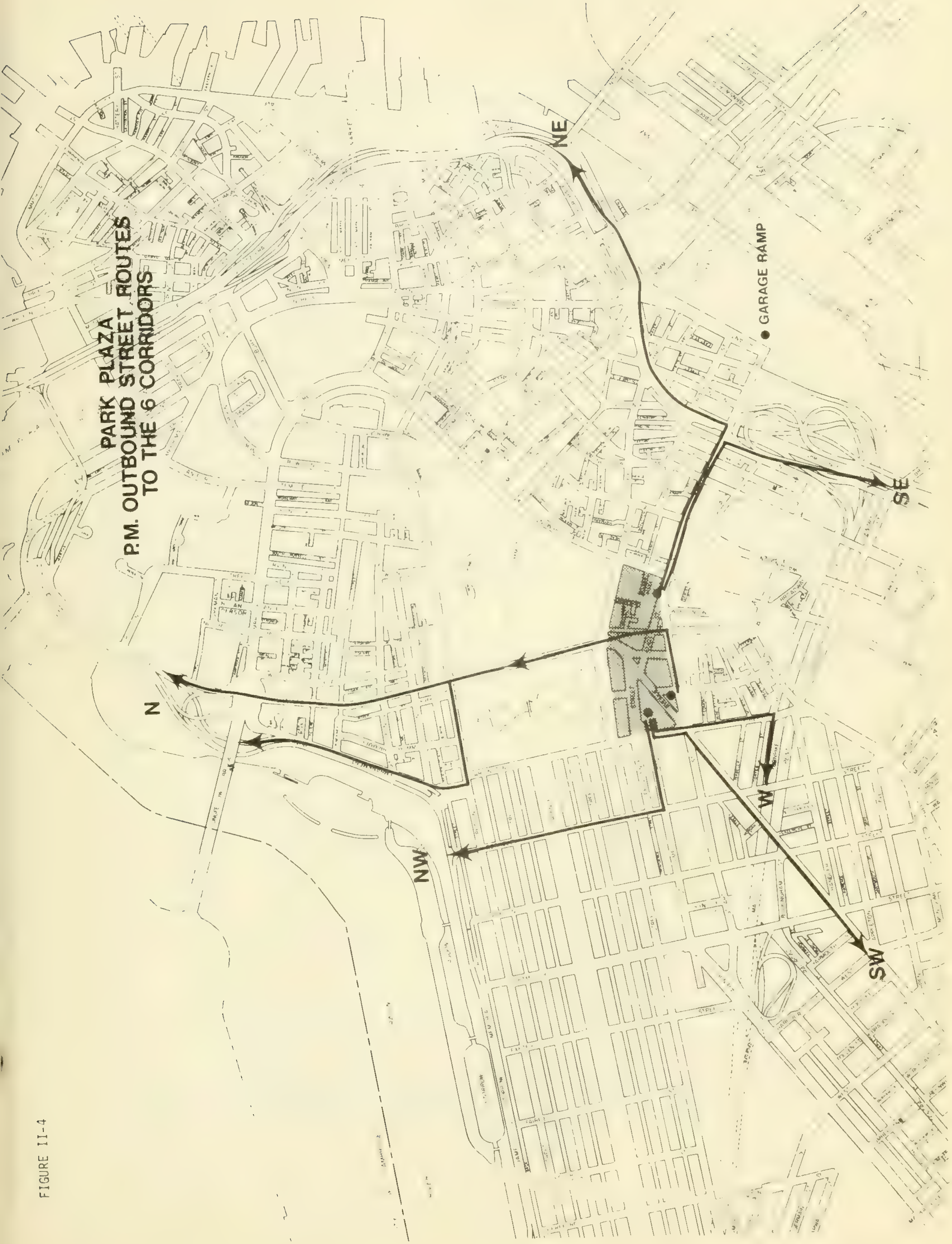
FIGURE II-2

FIGURE II-3



PARK PLAZA
A.M. INBOUND STREET ROUTES
FROM THE 6 CORRIDORS

FIGURE II-4



PARK PLAZA
P.M. OUTBOUND STREET ROUTES
TO THE 6 CORRIDORS

- northwest traffic will use Route 2, Storrow Drive, and Clarendon Street. Exit will by by St. James Avenue and Berkeley Street.

- west corridor traffic will be on the Massachusetts Turnpike, arriving from the Prudential Center exit, Dartmouth Street and Columbus Avenue. Outbound travel will use the Arlington Street entrance ramp to the Turnpike.

- southwest corridor traffic will use Columbus Avenue.

- southeast traffic will be from the Southeast Expressway and Stuart/Kneeland Streets.

The different inbound and outbound routings result from the pattern of one-way streets serving the area. Also, the street routings heavily depend on the location of the parking garage entrance and exit ramps. It is assumed that entrance is possible from Stuart Street as well as new Eliot Street, and that exit can be onto Stuart Street, new Eliot Street and Tremont Street.

Rapid transit routings inbound to and outbound from Park Plaza for each of the six defined corridors are defined in a similar manner to the auto routings and are displayed in Figure II-5. In each case, the outbound routing is assumed identical to the inbound route.

- northeast; Blue Line with transfer to Green Line at Government Center and exit at Boylston Station. While not included in the analysis, some trips will choose instead to transfer to the Orange Line with exit at Essex Street.

- north; Orange Line to Essex Street.

- northwest; Red Line with transfer to Green Line at Park Street and exit at Boylston Street. Some trips also will use Arlington Station or may choose to walk from Park Street; the analysis assumes, however, a 100% transfer to the Green Line.

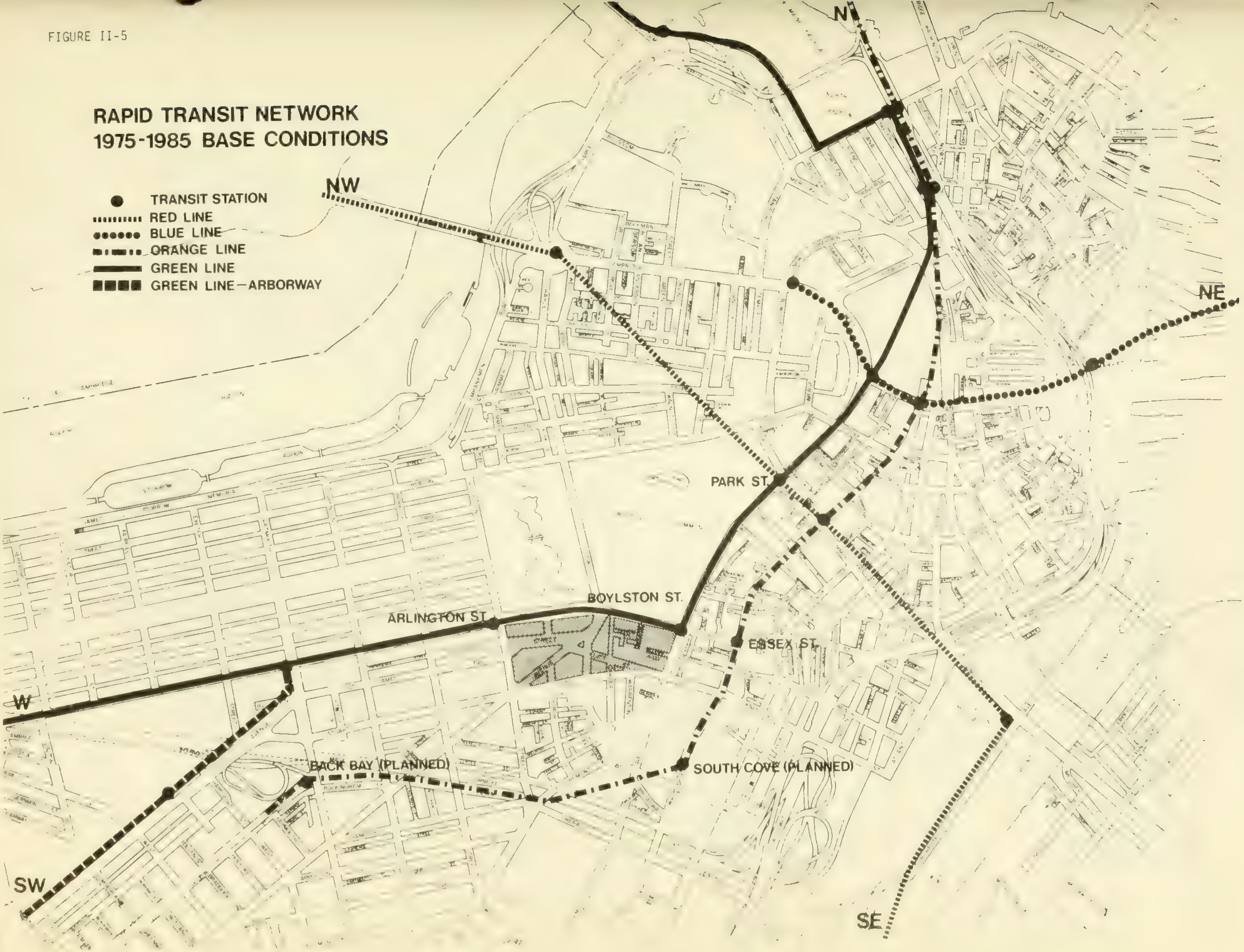
- west; Green Line to Arlington Street.

- Southwest; Orange Line to new South Cove Station. Some trips also likely to use new Back Bay Station.

- southeast; Red Line to Park Street with transfer to Green Line and exit at Boylston Street.

Commuter rail service to Boston is provided by the Boston and Maine system to the north and northwest and by the Penn Central system to the south and southwest. Both systems are now operated by the M.B.T.A. The Boston and

FIGURE II-5



RAPID TRANSIT NETWORK
1975-1985 BASE CONDITIONS

Maine service is through North Station and will handle commuter rail traffic from the northeast, north, and northwest corridors. These passengers are assumed to transfer equally to the Orange and Green Lines to reach Park Plaza. The Penn Central system will serve commuter rail traffic generated from the west, southwest, and southeast corridors. Exit is assumed to be at Back Bay Station with a quarter mile walk to Park Plaza, rather than at the line's terminus at South Station.

Highway System and Capacity - B22, 23

An examination of traffic dynamics in downtown Boston must examine the operation of highway flows at two separate levels:

- at the macro level, the expressway system utilized by half of all traffic destined for the CBD, and

- at the micro level, the local street system which serves as the distribution network once automobiles arrive in the downtown area.

At the present time, expressway access to Boston from the northeast, north, northwest, and southeast can be characterized as being heavily congested during both the morning and evening peak periods. The Massachusetts Department of Public Works reported 1972 average daily traffic flows were 82,000 - 121,000 for the Central Artery, 52,000 for the Massachusetts Turnpike, 64,000 for the Sumner/Callahan Tunnels, and 84,000 - 88,000 for Storrow Drive. In several cases, there are isolated points of stop-and-go conditions, such as the Mystic River Bridge and the merger of I-93 with the Central Artery. The effect of this condition in the morning is that the congestion points serve to control or meter the flow of vehicles onto the local street system, spreading the peak flows over time and reducing congestion on the local streets. Also, drivers themselves vary their travel times to avoid periods that are likely to be heavily congested, again resulting in a spreading of the peak and a lessening of local street flows.

A similar effect exists in the evening, although of course the expressways can no longer serve as metering devices for vehicles flowing onto the local street system. Still, there are points of heavy daily congestion on the expressway ramps and bridge approaches which lengthen the evening peak by changing departure times.

The hypothesis postulated is that several of the major access expressways are presently flowing at or near capacity and serve to limit auto traffic entering the downtown local street system. Without major expansion of the expressway system, which is not probable under the current highway moratorium, it is likely that traffic on the local street system will increase at a slower rate than it would if the expressways were not already congested. In the past, growth in traffic destined to the CBD has been

handled by providing increased highway facilities. Interstate 93, the Callahan Tunnel, and the Massachusetts Turnpike are examples of facilities which have been added in recent years to increase highway capacity. Now, with the highway moratorium, the total expressway capacity has finite limits, and new traffic is handled by a lengthening of the peak period.

Local Streets and Intersections

While the natural tendency is to think of local street conditions as flows of vehicles on streets, the critical determinents of capacity - and therefore of congestion - are the intersections, not those portions of the streets lying between intersections. If even one or two intersections are unable to handle the demands for turning movements and corssflows placed upon them, it is likely that congestion will rapidly spread from these isolated spots to numerous other areas. Field investigations indicate that several such critical intersections exist under present conditions in the Park Plaza area; including Boylston and Arlington Streets; Columbus, Stuart, and Arlington Streets, Boylston and Tremont Streets, and Tremont and Stuart Streets. Once congestion begins to form at one of these points, the queues may back up and block other intersections. It is for this reason that the analysis of Park Plaza impacts on local street traffic focuses on intersections potentially most severely impacted.

Traffic count data was obtained from the Boston Department of Traffic and Parking and used to prepare the maps of existing A.M. and P.M. peak flows illustrated in Figures II-6 and II-7. The most recent counts varied in date from 1967 to 1972 and included counts of individual turning movements at each intersection.* These data were than balanced and used as the basis for Figures II-6 and II-7.

Using existing traffic signal timing information and the number of moving traffic lanes for each intersection, estimates of existing intersection capacity were calculated using the Yale Bureau of Highway Traffic methodology. The results are presented in the tables contained in Chapter V in terms of hourly capacities of vehicles. The differences between the existing volumes and capacities gives an indication of the slack that is available in the system at the present time during the morning and evening peak hours. A saturated condition exists where the volume is close to or greater

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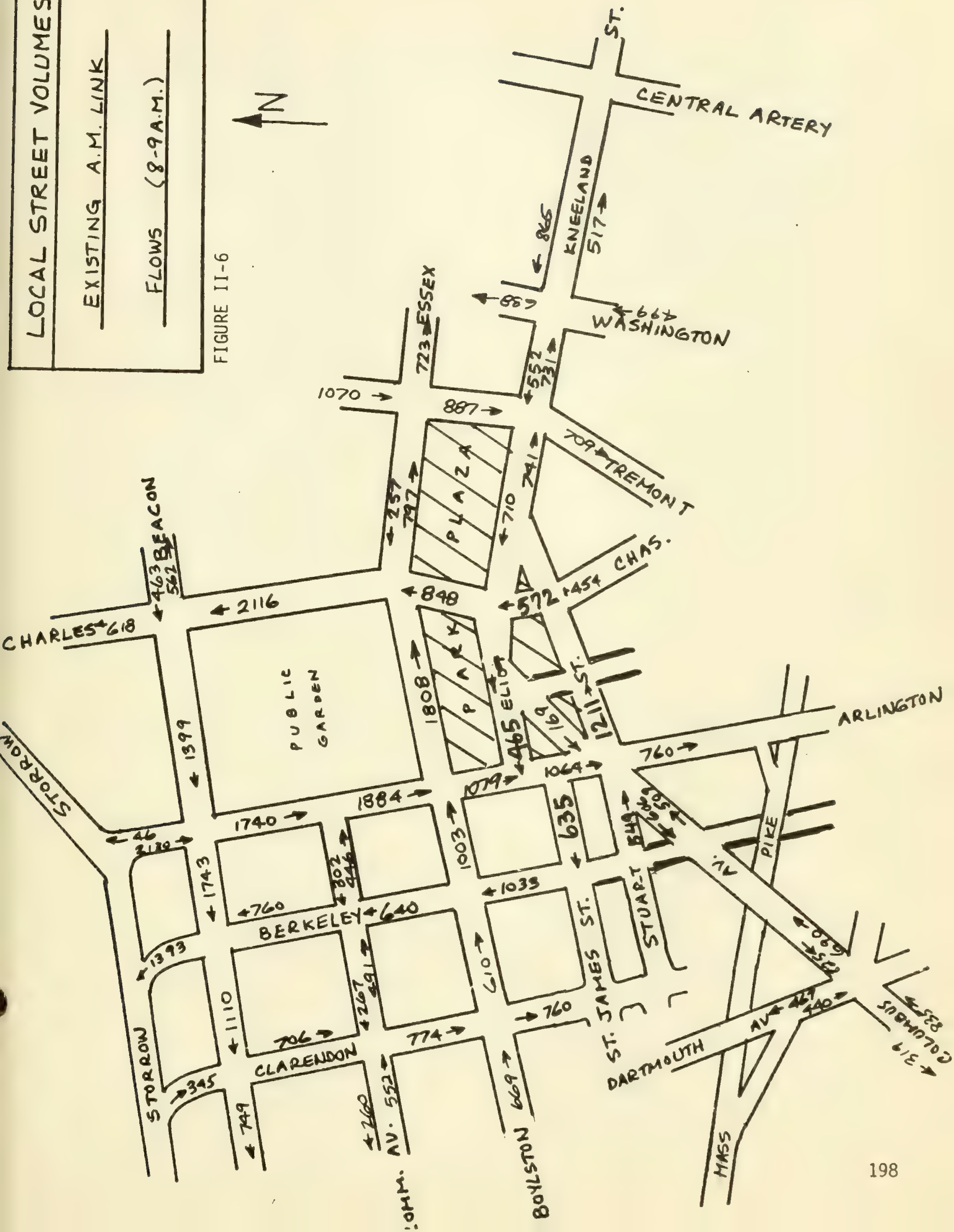
* Analysis of cordon count data during this period indicates a period of relatively stable traffic conditions. Given that the objective of this study is a determination of the likelihood of potentially adverse transportation impacts and not the timing of individual traffic signals, both the date and time spread of these counts are satisfactory for this analysis.

LOCAL STREET VOLUMES

EXISTING A.M. LINK

FLOWS (8-9A.M.)

FIGURE II-6

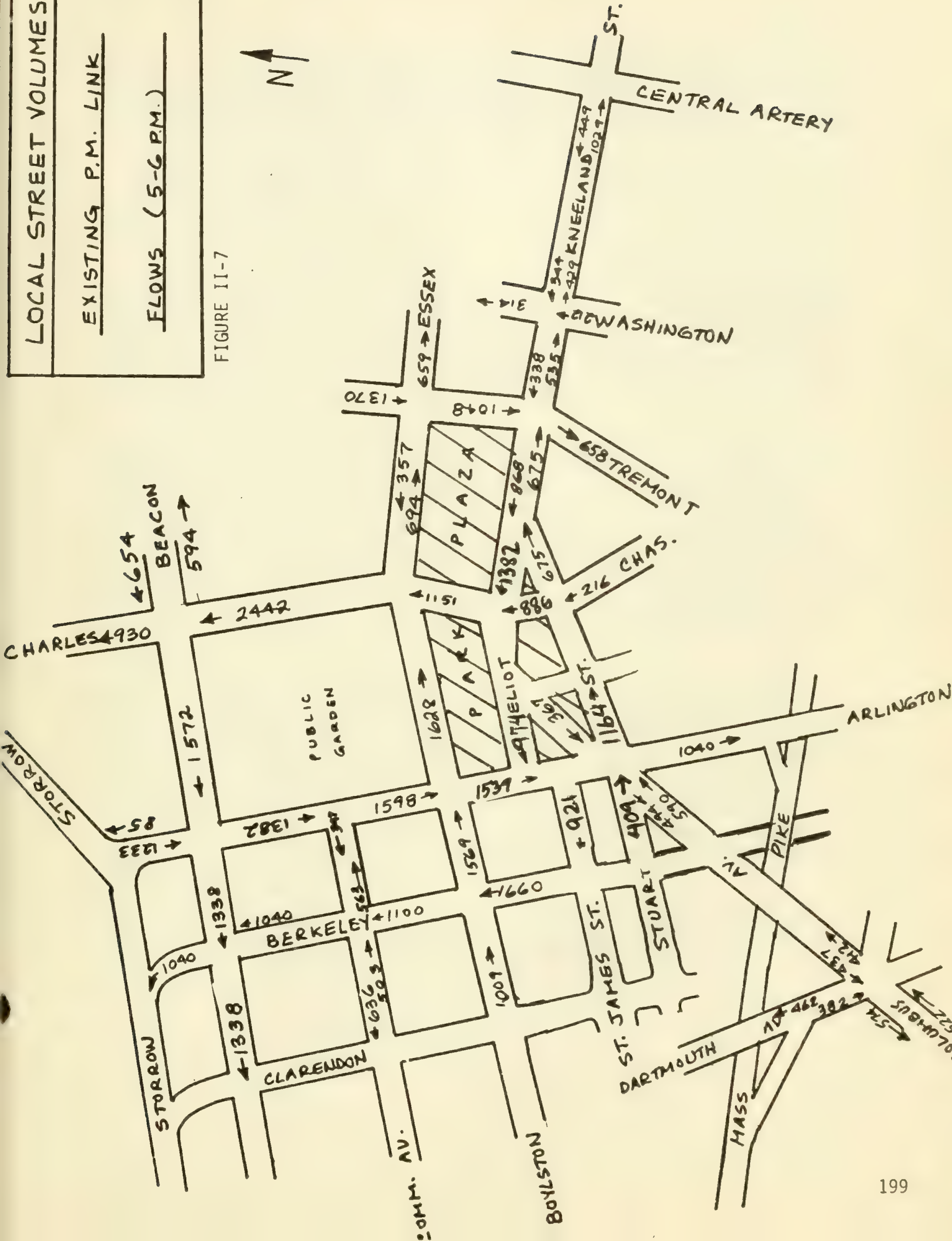


LOCAL STREET VOLUMES

EXISTING P.M. LINK

FLOWS (5-6 P.M.)

FIGURE II-7



than the calculated capacity. The following intersections potentially affected by Park Plaza, in addition to those identified above, have existing volume/capacity ratios approaching 1.0 for one or more directions of movement, with queues forming under periods of particularly heavy flow.

Beacon - Arlington
Columbus - Dartmouth
Charles - Beacon

Rapid Transit - B29, 30

Capacity of the M.B.T.A. transit system serving Park Plaza can be limited by either line capacity or station capacity. While a preliminary analysis and examination of historical trends indicated that the limiting factor would be one or more of the individual lines rather than the stations, both lines and stations have been examined. Also, though the Green Line is most proximate to Park Plaza, the three other lines also are expected to carry a large proportion of Park Plaza related trips.

The Green Line serves as both a high-density collector/distributor for downtown and a suburban line-haul facility. It currently operates with a scheduled peak period headway of 64 seconds in the central tunnel and train length of either 2 or 3 cars. A 1974 count at Arlington Station, at the line's most heavily used point, indicated an outbound P.M. peak hour line count of 8100 passengers and an inbound A.M. peak hour of 7300 passengers per hour per direction as the current scheduled capacity, based on a passenger loading of 90 passengers/car for the PCC cars. "Crush loading" can be as high as 120. Thus, the Green Line is operating at or near its capacity limit. The peak hour factor in the 1974 count was .218.

Current problems on the Green Line result from an insufficient fleet of cars, unreliable frequency of service, unreliability of the PCC cars, and long station dwell times caused by the number and poor location of the car doors. Because four Green Line surface routes converge in the central tunnel with no systematic scheduling, bunching of cars and poor schedule reliability occur. In contrast, the 1947 headways were from 36 to 40 seconds with one car trains and yielded a capacity of about 18,000 passengers per hour per direction at Arlington station. However, there were also more vehicles in service at that time and they were in considerably better running condition.

The Orange Line is a high-platform, rapid transit subway system with current northbound ridership of 10,400 passengers/hour/direction in the P.M. peak. The A.M. northbound peak volume is 9000 passengers/hour/direction.*

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* See footnote on the following page.

Scheduled capacity is 11,900 passengers/hour/direction and trains run approximately every 3.5 minutes with 4 cars. The scheduled capacity is based upon 175 passengers/car maximum, which gives each standee 2.0 square feet of floor space.

The Red Line capacity at Park Street, which is the closest Red Line station to the site, is 20,900 passengers/hour/direction in the peak with headways of 3.2 minutes. The Red Line cars carry an average of 275 passengers/car at 1.5 square feet per standee. The current P.M. northwest bound volume west of Park Street station is 9800 passengers/hour and the P.M. south bound at South Station is 14,000. The A.M. outbound count is 7900.* Four car trains are run during the peak.

The Blue Line has a current scheduled capacity of 10,000 passengers/hour/direction and runs on a 3 minute headway during the peak. Each car can carry 125 passengers at 2.25 square feet per standee and 4 car trains are run during the peak hour. The current inbound A.M. peak hour count is 8000 passengers and 8200 outbound for the P.M. peak.*

The M.B.T.A. 1974 map of station boardings is shown in Figure II-8. Park Street Station, handling both Green and Red Line passengers, has a count of 24,161 passengers per day, excluding transfers between the two lines. Essex Station on the Orange Line has a turnstyle count of 5834 passengers per day and Arlington Station on the Green Line has a two direction turnstyle count of 11,403 passengers per day. As a rough measure of current excess station capacity, Arlington Street handled 32,000 passengers per day in 1947 when maximum M.B.T.A. passenger counts were recorded.

Commuter Rail - B32

Boston is served by two separate commuter rail systems, though both are now operated by the M.B.T.A. The Penn Central to the south and west operates 12 trains inbound in the morning and 11 outbound in the afternoon. Service is generally limited to 1 or 2 trains per line per period except for the Needham Heights branch which carries 3. A 1974-75 winter passenger count showed A.M. and P.M. riderships of 4530 and 3637 respectively, versus available seats of 4872 and 4304.

The Boston and Maine serves the northern and northwestern regions of the Boston area arriving and departing from North Station. Current Boston and Maine ridership is approximately 10,000 passengers per day. The 1972 Commuter Rail Improvement Program Report indicated a typical 1972 weekday

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* Orange Line traffic is based on a 1965 M.B.T.A. characteristic count taken at Essex Street. Red Line traffic is based on a 1965 M.B.T.A. characteristic count taken at Park Street. Blue Line traffic is based on a 1965 M.B.T.A. characteristic count taken at Aquarium. Each count has been factored down by 6% to account for declining ridership. Capacities are based on data contained in Volume One of the M.B.T.A.'s Central Area Systems Study.

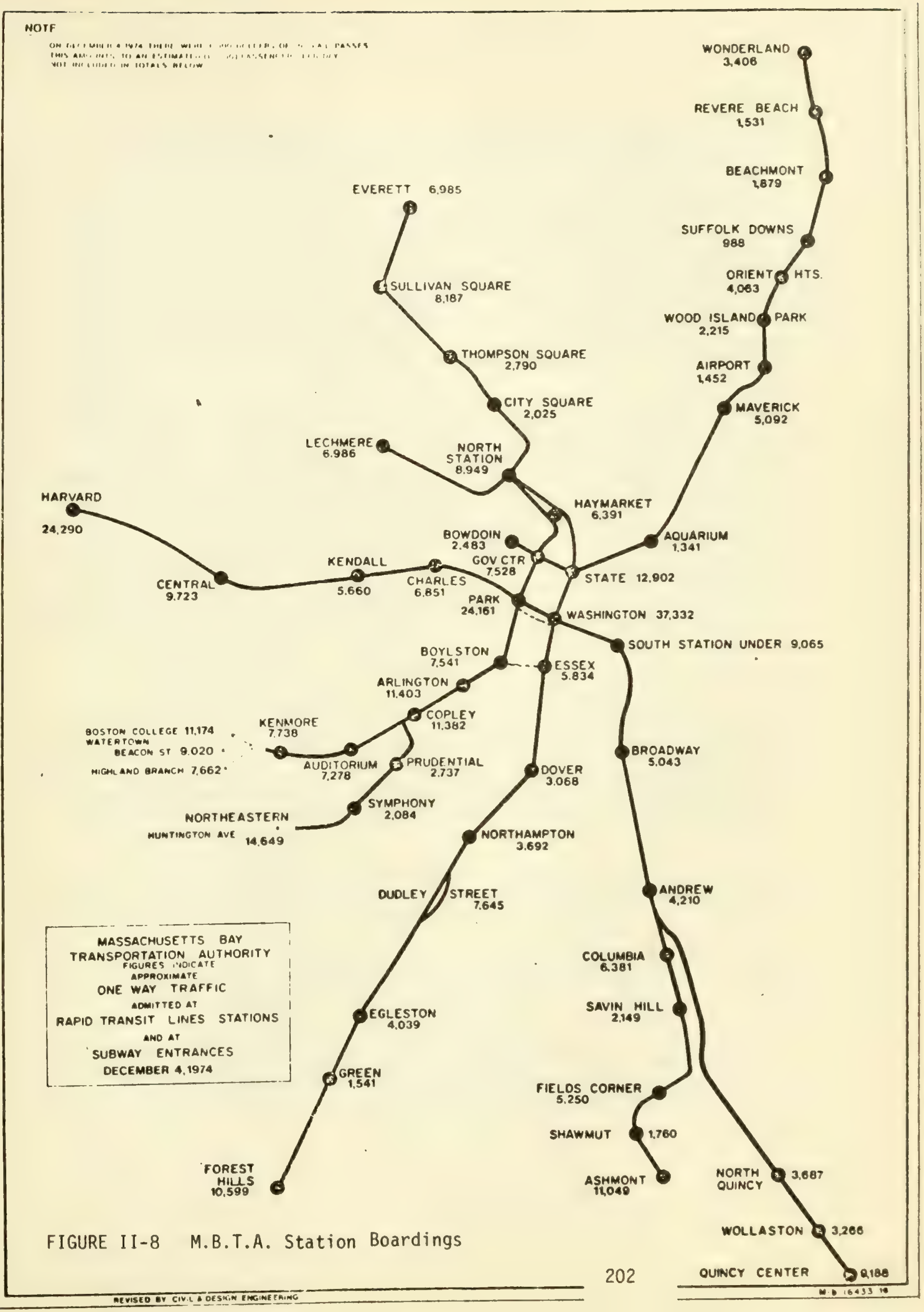

FIGURE II-8 M.B.T.A. Station Boardings

7:30 - 9:00 A.M. ridership of approximately 9800 with a range of 60 to 106 percent of the seats occupied. The average occupancy of the four main lines was 78%.

1972 total yearly passengers for the Boston and Maine were 5,413,735 compared to the Penn Central's 1,950,000 (estimate). The Penn Central serves both South Station and Back Bay Station, and it is felt that most Park Plaza related commuter rail passengers will choose to use the Back Bay location because it is closer to the site than is South Station. A 1974 count indicated that 34.5% of Penn Central riders utilized the Back Bay Station rather than South Station. The range on all branches except Needham was 27-33%; in contrast, 44% of the Needham passengers chose Back Bay Station.

The problems of the commuter rail system are basically the same as those facing most public transportation services, declining ridership in the face of rapidly rising costs. For example, Penn Central gross annual costs will rise from $2,330,602 in 1966 to an estimated $6,230,000 in 1975. In the same time, annual ridership will change from 2,480,824 to 2,407,116 and net annual costs will rise from $1,265,125 to an estimated $4,030,000. The estimated per ride deficit therefore is estimated to rise to $1.67. The two major questions with respect to commuter rail service are (1) will the commuter rail improvement program succeed in increasing ridership, and (2) will the Commonwealth and local communities continue to be willing to underwrite the annual deficits?

Local and Commuter Bus - B29, 30

Five bus operators, in addition to the M.B.T.A., currently use Park Square as the base of their inter-city and suburban bus operations. These are Continental Trailways, Peter Pan, Gray Line, Almeida, and Trombley. The majority of these services utilize the yard at the Continental Trailways station but because of inadequate bus parking space, many buses board and unload from illegal on-street parking spaces in the Park Square area on Eliot and Charles Streets.

The M.B.T.A number 700 express from Lowell also operates from Park Square as do two local bus routes. These are number 43 arriving from Tremont Street and number 691 running on Columbus and St. James.

Table II-1 summarizes bus movement data avilable from the B.R.A. There are a total of approximately 91 inter-city or commuter bus arrivals and departures, carrying approximately 4900 passengers.

These bus operations add significantly to existing traffic congestion in the Park Square area and on surrounding streets. Many of the buses currently use either Columbus Avenue or Stuart - Kneeland Streets as their principal route of access or egress. The scheduled movement of these bus

TABLE II-1

PASSENGER AND BUS DATA FOR TRAILWAYS STATION, PARK SQUARE

Bus Route or System	7-9 A.M.		4-6 P.M.		Remainder		Total Persons	
	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.
M.B.T.A. 700 Express	288	11	7	267	58	136	353	414
Grayline							2000*	
Almeida							For 35 buses 1100	
Trombley							470	566
Trailways**	4	6	3	9	28	29	35	44
Peter Pan**			1	1	4	6	5	7

* estimate

** bus arrivals and departures

operations and the Trailways terminal to the new South Station Transportation Terminal should alleviate this cause of local congestion, as well as remove the large share of existing pedestrian traffic related to the bus terminal.

Parking - B24, 25

Major supplies of both off-street and on-street parking are available in the Park Square area. Parking data were obtained from the various surveys collected in association with the recently completed Wilbur Smith and Associates report "An Access Oriented Parking Strategy for the Boston Metropolitan Area" (1974), and also from the City of Boston Department of Traffic and Parking.

Within the Park Plaza site area itself, there are presently two large, older garage facilities; the Motor Mart Garage with a capacity of 900 vehicles and the Eliot Street Garage with a capacity of 500 vehicles. In addition, there are four smaller open lots having a total capacity of 274 cars. These six facilities are scheduled to be replaced with a single new garage varying in size from 1395 to 3131 vehicles depending on the specific alternative.

The Wilbur Smith and Associates study showed a variation in the average walking distance from 170 feet for private garages to 1,745 feet for public garages. For purposes of this analysis, a figure of 1320 feet (1/4 mile) from the Park Plaza site area has been used as the limit of the parking inventory. Within this envelope, there are presently 39 lots and garages with a total of 6877 spaces.* The distribution of size of these facilities is as shown in Figure II-9. The 10:00 A.M. occupancy based on a 86% sample is 67%. Thus, approximately 2300 spaces are currently available at 10:00 A.M. within one quarter mile of Park Plaza. Since most employees have already arrived at work by this time, this figure indicates roughly the amount of parking presently available to shoppers and other visitors.

One reason for the low occupancy in these facilities is the desire, particularly for short term visitors, to park in low-cost on-street spaces. Presently there are approximately 1500 legal on-street parking spaces in the quarter mile area surrounding the Park Plaza site, based on a 1968 B.R.A. survey. This number will fluctuate slightly from day to day for street cleaning, and from hour to hour for peak hour parking bans. The average on-street turnover for the downtown area is 3.3 parkers per space, and the spaces are usually always occupied during the day. The inclusion of illegal on-street parking, which is heavily utilized in the area as in other parts of Boston, would further increase the inventory of available parking.

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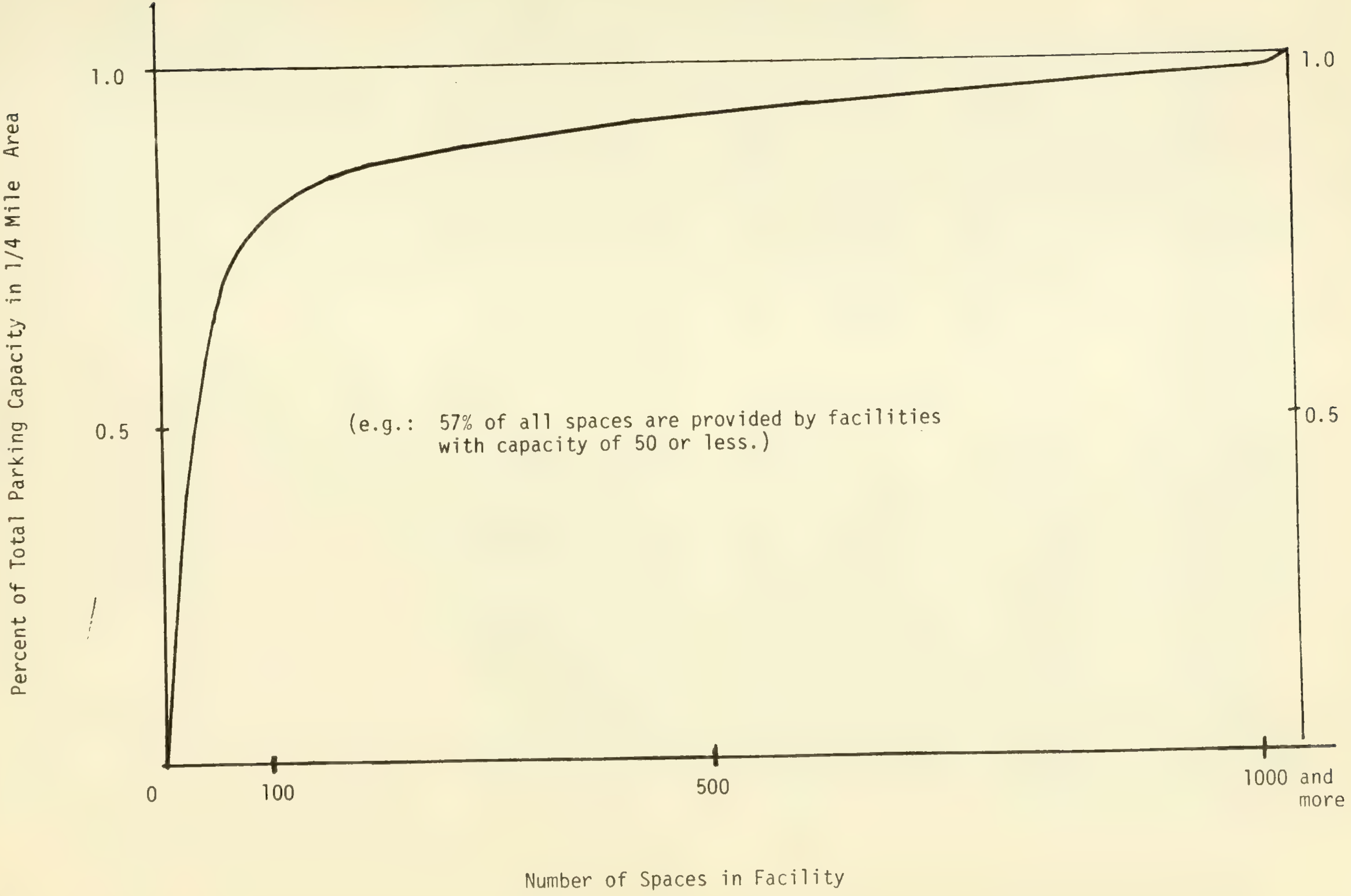
* These figures exclude the six on-site facilities.

FIGURE II-9

Cumulative Capacity vs Parking Facility Size

within Park Plaza 1/4 Mile Walking Distance


(e.g.: 57% of all spaces are provided by facilities with capacity of 50 or less.)

A major parking problem occurs in the evening and at night in the neighboring residential areas of Bay Village and Back Bay. Both areas currently experience a severe on-street space shortage and residents find it especially difficult to locate space in the evening.

Pedestrian Movement - B27

The major direction of pedestrian movement in the Park Square area is east-west, with the Trailways Bus Terminal serving as a large attractor within the site area itself. Other large pedestrian movements are oriented toward the Arlington and Boylston M.B.T.A. stations and also in a north-south, cross-site direction between the Bay Village area and the Public Garden and Boston Common.

Table II-2 shows existing hourly two-way pedestrian movements along selected streets in the Park Plaza area, based on a 1971 B.R.A. survey. The P.M. flows, even excluding the bus terminal movements, are considerably higher than the corresponding morning counts. The largest pedestrian volumes are shown as occurring on Boylston Street between Charles and Tremont, on Eliot Street near Tremont, and on Providence Street. To place these volumes in perspective, they represent less than one-quarter of the pedestrian volume levels observed along Washington Street and on Tremont street near Park Street, two of the more heavily walked streets in the core area.

Potential areas of conflict between vehicular traffic and pedestrian movement which may occur after Park Plaza is opened to occupancy are the same as those that exist now. These are the crossings of Charles Street at Boylston Street, Stuart Street, and within the site area itself, and the Charles Street and Tremont Street crossings of Boylston Street. The Charles Street crossing will handle persons bound for the Boston Common Garage, Beacon Hill, and also across Boston Common to Park Street and Government Center. The Boylston Street crossing is necessary to gain access to the M.B.T.A. Green Line Boylston station and may be used for other trips to and from the core area of downtown Boston.

TABLE II-2

EXISTING PEDESTRIAN MOVEMENTS

Location	A.M.	P.M.*
Public Garden (Boylston)	390	397
Boylston Street		
Public Garden		776
Boston Common		1640
Providence Street		1200
Eliot Street	396	596
Stuart Street	255	1080
Boston Common (diagonal)	378	1215
Church Street		476
Charles Street		592
Carver Street		92

* Excludes bus terminal movements

Source: B.R.A. 1974 pedestrian traffic count

Water Supply and Distribution System - B39, 40, 41, 42

The site has several major water mains passing along its boundaries and through its center. Among these mains, the site is serviced by the southern high service and the southern low service system. Exhibit 2-4 identifies the southern low service water distribution network; while, Exhibit 2-5 identifies the southern high service water distribution network.

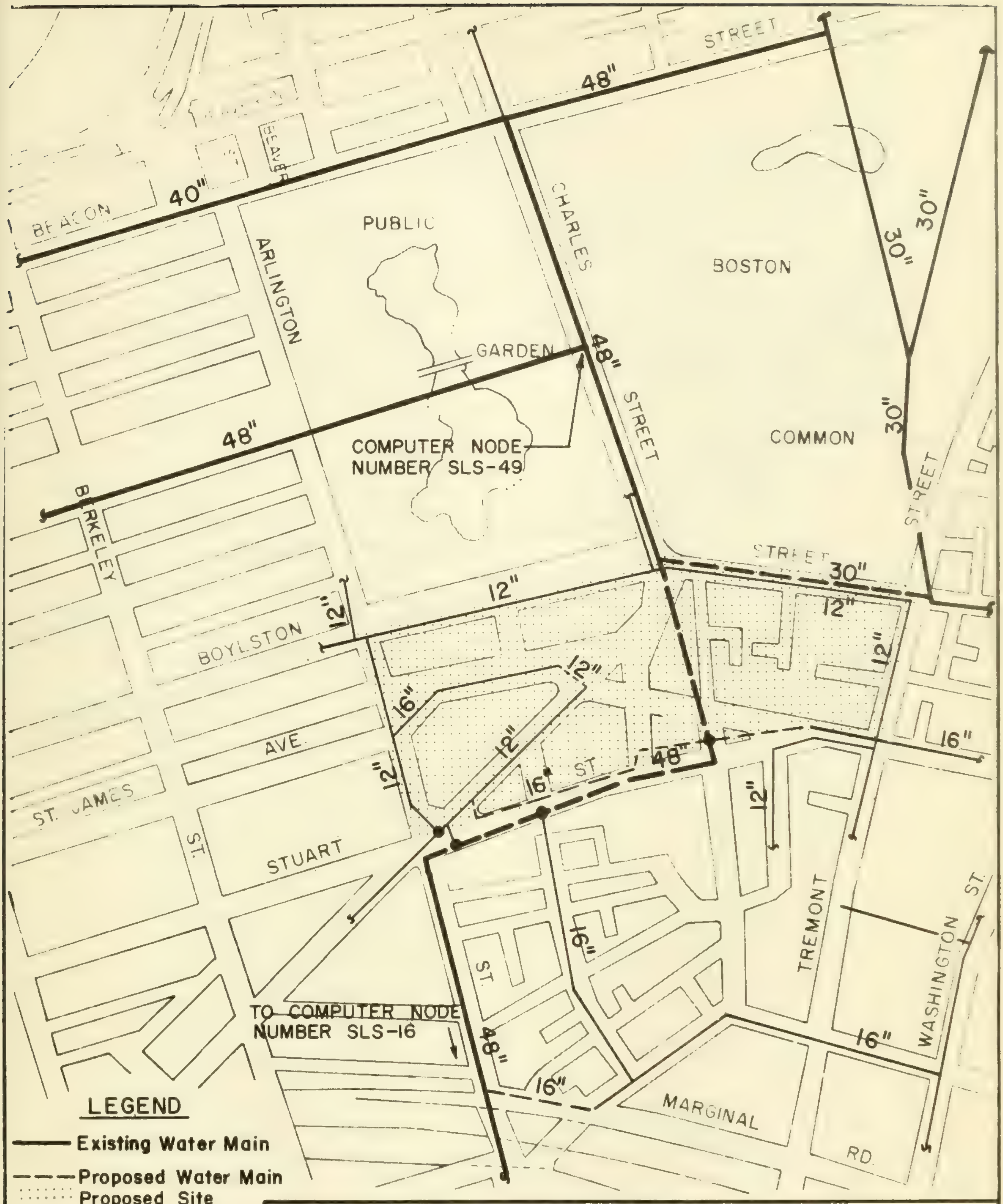
From the southern low service distribution system, a 48 inch diameter water main extends from Arlington Street onto Columbus Avenue and Charles Street through the project area.

The SHS in Park Plaza consists of two mains, 20 inch and 16 inch in diameter, extending from Boylston Street and Columbus Avenue, respectively. These lines are closely interconnected in loops with two nearby service lines. One connection is in the Boston Common with a 42 inch water main which extends from Newbury Street through the the Public Garden. The other connection is with a 12 inch main extending along Kneeland Street from the South Cove area.

. Park Plaza Demands - The present water demand by existing users in the Park Plaza area is listed in Table 2-I. For the purpose of this study it is assumed that the low service system supplies about 40 percent. Applying the demands from Table 2-I the flow in the southern low service 48 inch diameter water main was found to be 360 gpm at peak hour demand. This demand is roughly equivalent to 0.80 cfs at a velocity of 0.06 feet per second. The corresponding combined flow in the 16 inch and 20 inch water mains of the southern high service was found to be 240 gpm at peak hour demand. This demand is approximately equivalent to 0.534 cfs at a velocity of 0.15 feet per second. Using an absolute measure of pipe capacities, at 5 feet per second, the 16 and 20 inch SHS network can deliver 18 cfs and the 48 inch SLS pipe can deliver 63 cfs. Both values are in excess of present demands.

. High Pressure Fire Service - Exhibit 2-7 shows the extent of the HPFS, for the Park Plaza area. (approximately 50 per cent) As indicated in Exhibit 2-7, the total Park Plaza area is not presently served by this pressurized system. The principal lines are limited to the Charles Street and Columbus Avenue area.

. Fire Services System Capacity - HPFS, SHS, SLS - The separate HPFS has the capacity to deliver 6,000 gpm of water at a minimum pressure of 100 pounds per square inch (psi). The average pressure of the system is 150 psi during a normal fire demand. A maximum pressure of 200 psi is allowed in the system. The limit of 200 psi is based on the ability to manually control fire hoses with high pressures. The HPFS is used effectively with hand held lines of normal length and is also used in direct connection with the operation of mobile deck guns. The mobile equipment also contains its own high pressure pumping apparatus and when connection to SHS or SLS produces higher pressure.



LEGEND

—— Existing Water Main

– – – Proposed Water Main

⋯ Proposed Site

Note:

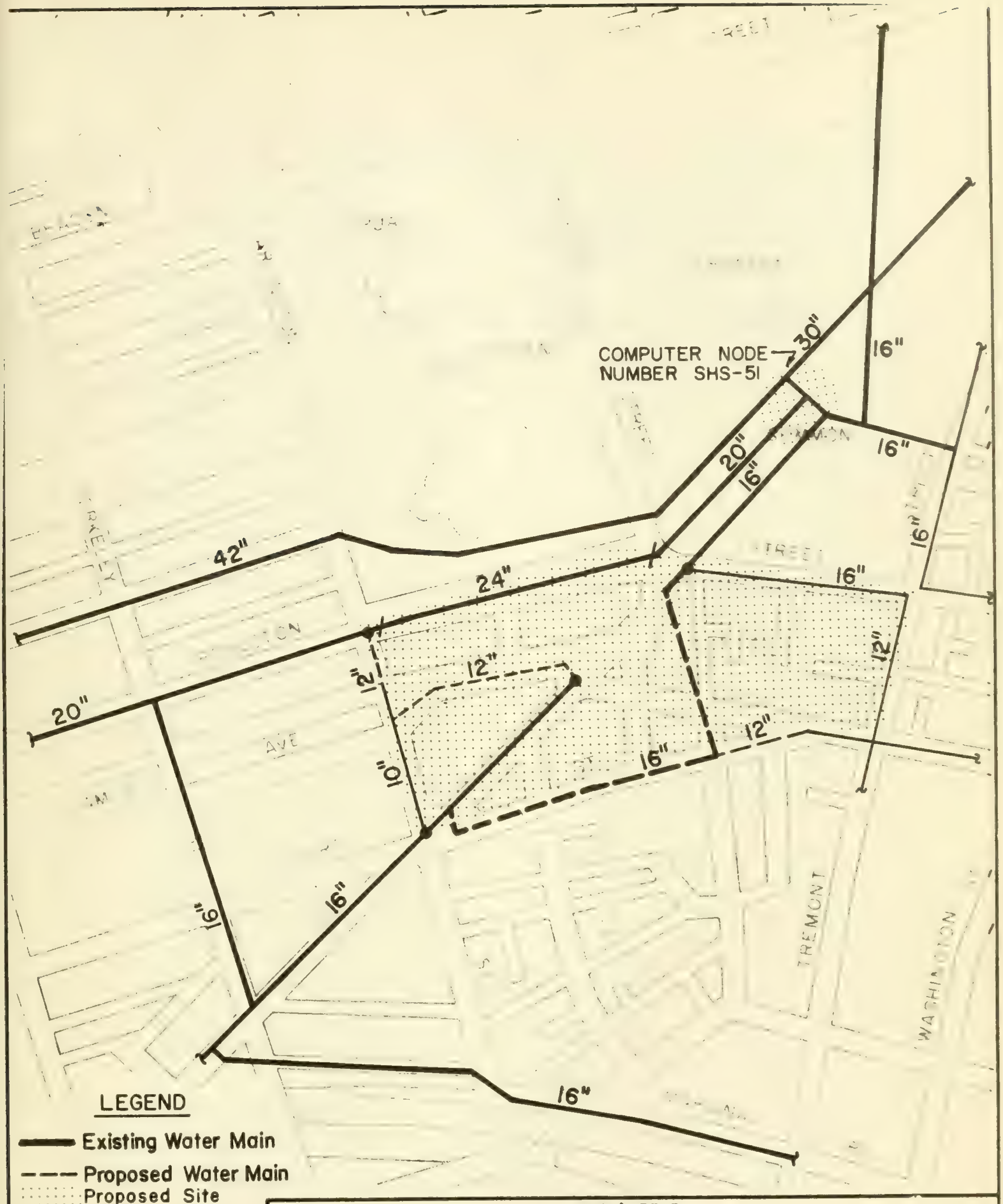
ɟ Line Denotes
Major Supply Lines

MAIN
Engineers

PROPOSED PARK PLAZA DEVELOPMENT AREA

SOUTHERN LOW SERVICE WATER DISTRIBUTION NETWORK

SCALE: 1" = 400' APRIL, 1975 EXHIBIT 2-4



Note:

ry Line Denotes
Major Supply Lines

MAIN
Engineers

PROPOSED PARK PLAZA DEVELOPMENT AREA
SOUTHERN HIGH SERVICE WATER DISTRIBUTION NETWORK

SCALE: 1" = 400'   APRIL, 1975   EXHIBIT 2-5

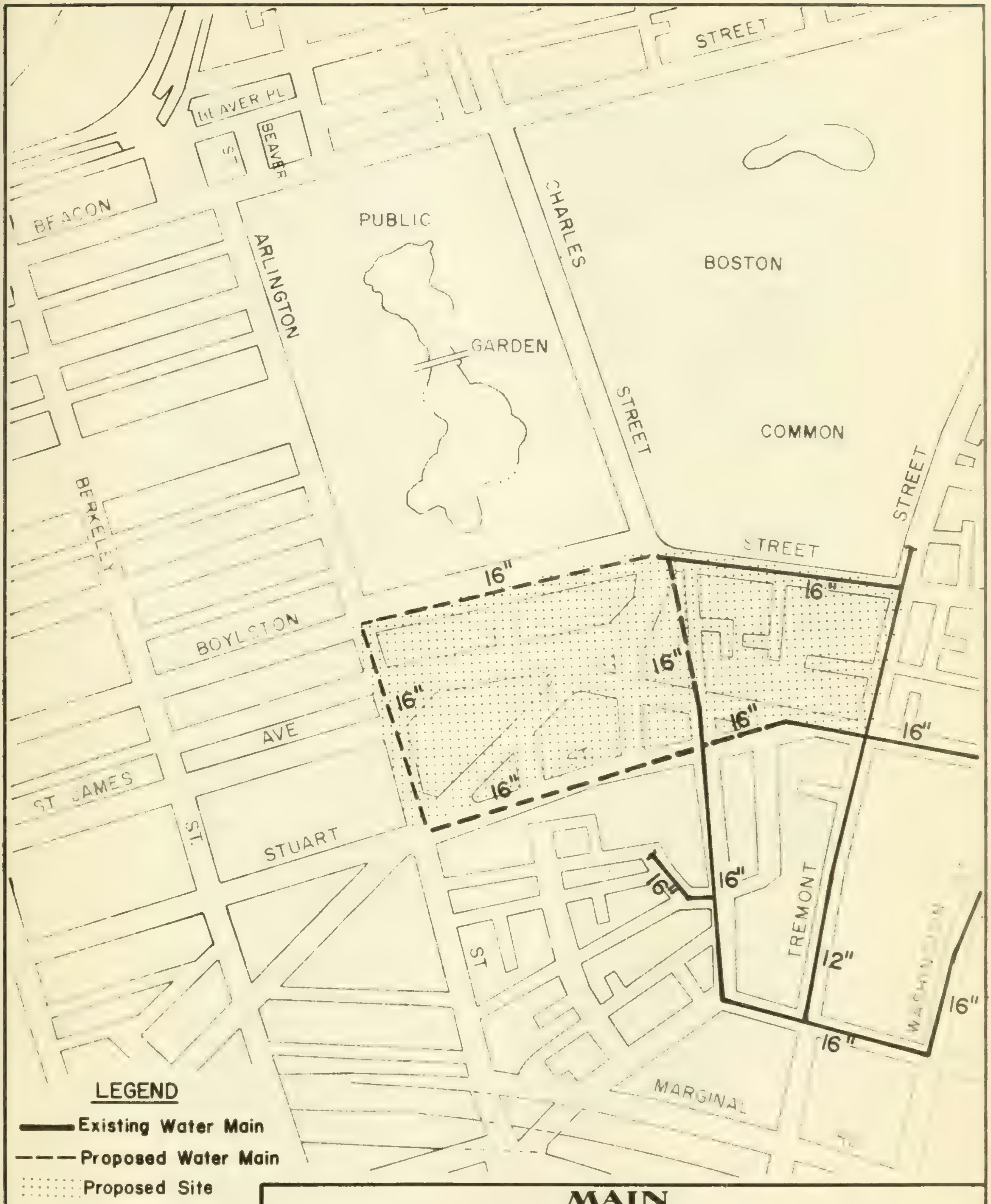
TABLE 2-I

1975 Estimated Park Square Demands [(a)]

Functional User	Use Per Capita per day, gpcd	Number of People	Average Daily Use, gals.
Residential:			
Apartments	150	41	6,150
Employment:			
Retail, Office, Hotel and Schools	40	3,052	122,080
Transients:			
Shoppers & Business	20	1,800	36,000
Hotel Guests	150	700	105,000
Passengers	1.5 (b)	2,500	3,750
Total Population		8,093	
Average Daily Use, gpm			189
Average Daily Per Capita Use, gpcd:			34
Approximate Peak Use, gpm:			600

Note: (a) See Appendix A for Reference.

(b) Based upon Greyhound Bus Terminal annual consumption records.



MAIN
Engineers

PROPOSED PARK PLAZA DEVELOPMENT AREA
HIGH PRESSURE FIRE SERVICE

SCALE: 1" = 400'
APRIL, 1975
EXHIBIT 2-7

Where HPFS is not available in the Park Plaza area, mobile pumping units can utilize the SHS and the SLS. For the SHS the fire stream available is 17,500 gpm at 50 psi; while, the SLS provides 26,000 gpm at 50 psi. In order to use lower pressures a system of pumping units in series is necessary to achieve the required high pressure. Normally a total of 12,000 gpm is required to fight most fires. This is compared to the minimum 17,500 gpm provided by the SHS.

Sewer System*- There are two sewer systems which carry the sanitary sewage and storm runoff wastewater from the proposed Park Plaza Development site. One is a separate sanitary sewer system and the other a combined sewer system. The combined sewer system receives all storm water runoff and some of the sanitary flow. More precisely, these main or trunk sewer systems are the sanitary sewer in St. James Avenue and the combined sewer under the Public Garden. Both of these sewer systems tributaries to the West Side Interceptor of the Boston Main Drainage System.

- Sanitary Sewer System - Approximately 12.5 acres of the proposed Park Plaza Project area are tributary of a 22 inch diameter separate sanitary sewer flowing west on St. James Avenue. (See Exhibit 2-11). This sewer is the upper reach of the major sanitary system in the Back Bay area. Beginning in Park Square this sewer extends along St. James Avenue to Dartmouth Street and along Boylston Street to Hereford Street where it has a direct connection with the West Side Interceptor. Varying in size from 22 inches in diameter to 3'-3" by 2'-9", this sewer drains about 65 acres of the Back Bay.

- Combined Sewer System - The combined system carries the sanitary wastewater from about 40 acres including the portion of the project area not serviced by the sanitary sewer of St. James Avenue. The major area served is the Bay Village in the South Cove. The storm water runoff is received from a total drainage area of 55 acres including all of the project site. Exhibit 2-12 shows the plan view of the combined system of the project site plus the tributary areas.

The main sewer of the system is the pipe extending under the Public Garden. This sewer extends from Boylston Street under the Public Garden discharges dry weather flows through a 24 inch connection to the West Side Interceptor at Beacon and Brimmer Streets. Storm flows discharge to the Beaver Street overflow conduit which in turn discharges to the Boston Marginal Conduit. The above condition represents, presently, a potential contribution of pollution to the Charles River Basin and ultimately to Boston Harbor.

* B49, 50, 51, 52

. Existing Sewer Capacity - The present peak sanitary demand of the sewer system servicing the Park Plaza area is approximately 5 million gallons per day (MGD). Table 2-II presents a summary of dry weather flows in Park Plaza and the tributary area in South Cove. About 1 MGD is generated by the project area, and the remaining 4 MGD is from off site areas. (Table 2-III lists the demands of the tributary areas. The sanitary sewer under St. James Avenue and the combined sewer under the Public Garden carry approximately 0.5 MGD and 4.5 MGD, respectively.

The capacity of the 22 inch sewer of St. James Avenue between Arlington and Berkeley is approximately 2.25 MGD. The 24 inch diameter dry-weather connection of the combined sewer under the Public Garden has a capacity of approximately 9 MGD, making a total available capacity of 11.25 MGD for sanitary sewage. Therefore, the existing sewer systems are more than adeguate for present sanitary loadings (i.e., 5 MGD compared to a capacity of 11.25 MGD).

The storm runoff from the drainage area servicing the Park Plaza site is carried by the combined sewer under the Public Garden. In determining the capcity for storm loading, this sewer was analyzed using the estimated runoff from a once in 15 year frequency storm. In estimating the peak rate of storm water runoff the standard "rational method" was used. The rational method required the capacity of conduits to be computed using Equation (1) below:

$$Q = CiA \quad .... \ (1)$$

where: Q = Volume of water runoff in cubic feet per second, cfs

C = Coefficient of runoff

i = Rainfall intensity at the time of concentration for the reach of the conduit

A = Drainage area tributary to the conduit.

The intensity of rainfall, i, is based on the Weather Bureau Technical Paper No. 40, "Rainfall Frequency Atlas of the United States." (See Exhibit 2-13.) The tributary area is shown in Exhibit 2-12. The coefficient C was estimated at value 0.85.

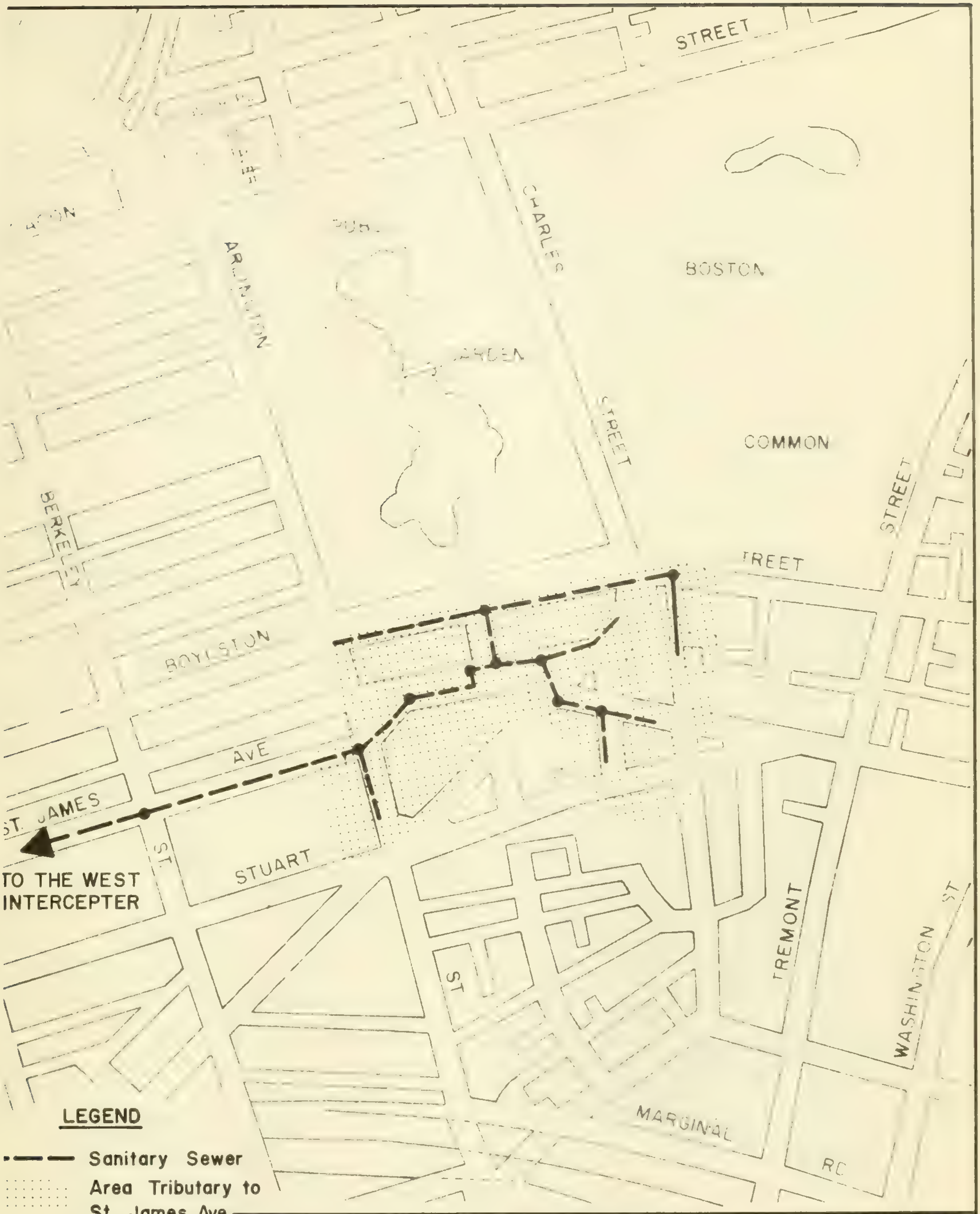
Calculations indicated that an excessive surcharge condition will exist in the combined sewer when the once in 15 year storm occurs. The hydraulic grade line will rise to within several feet of Boylston Street which is at the edge of the project area.

Besides the limited capacity of the Public Garden sewer there are other factors contributing to the surcharge condition. The tidegate chamber at Beacon and Beaver Streets is constructed on top of the West Side Interceptor. The invert of the chamber

is at Boston Base elevation 6.0. This means that before overflows of mixed sewage can discharge to the Boston Marginal Conduit the system upstream will surcharge until sufficient head is created to induce flow.

Another factor affecting surcharge is the tidewater intrusion in the Marginal Conduit. Storm flows concurrent with high tides will cause discharge from the conduit to the Charles River Basin which has a controlled elevation of Boston Base 8.0. Therefore, the combined system will surcharge to an elevation which will cause adequate head to induce flow to the Charles River Basin.

The surcharge will be mitigated to some extent by the elimination of tidewater intrusion when the Charles River marginal conduit project is completed. However, the condition will require further modifications.



LEGEND

- — — Sanitary Sewer
- ⋯ Area Tributary to St. James Ave. Sanitary Sewer

MAIN
Engineers

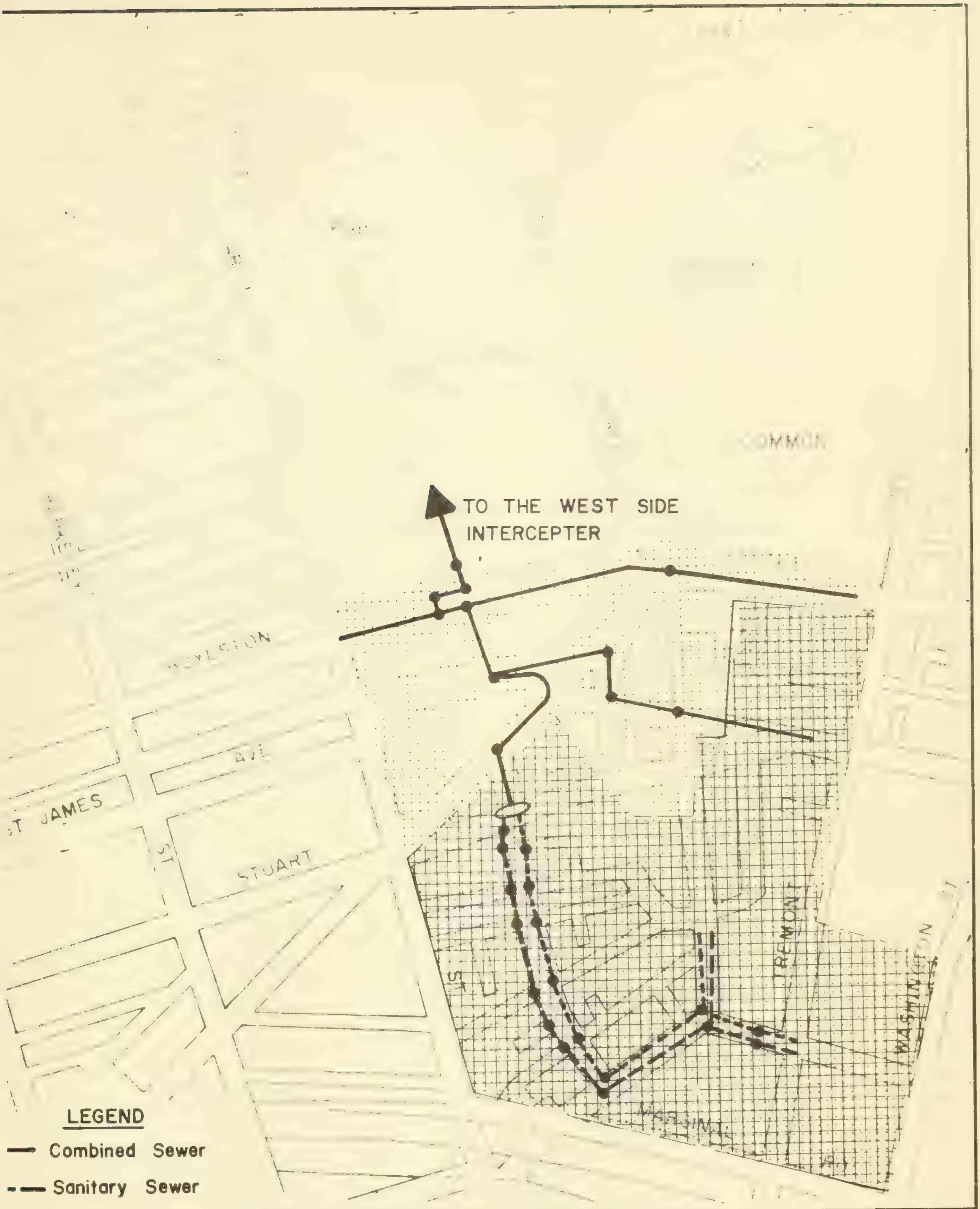
PROPOSED PARK PLAZA DEVELOPMENT AREA

SANITARY SEWER SYSTEM

SCALE: 1" = 400'

APRIL, 1975

EXHIBIT 2–11



LEGEND

— Combined Sewer

—— Sanitary Sewer

-- Storm Drain

⋯ orm Drainage
unoff Area

▦ Sanitary Sewer
Tributary Area

MAIN
Engineers

PROPOSED PARK PLAZA DEVELOPMENT AREA

COMBINED SEWER SYSTEM

SCALE: 1" = 400'   APRIL, 1975   EXHIBIT 2-12

Table 2-II

Sanitary Sewer Capacities and Demand

1975

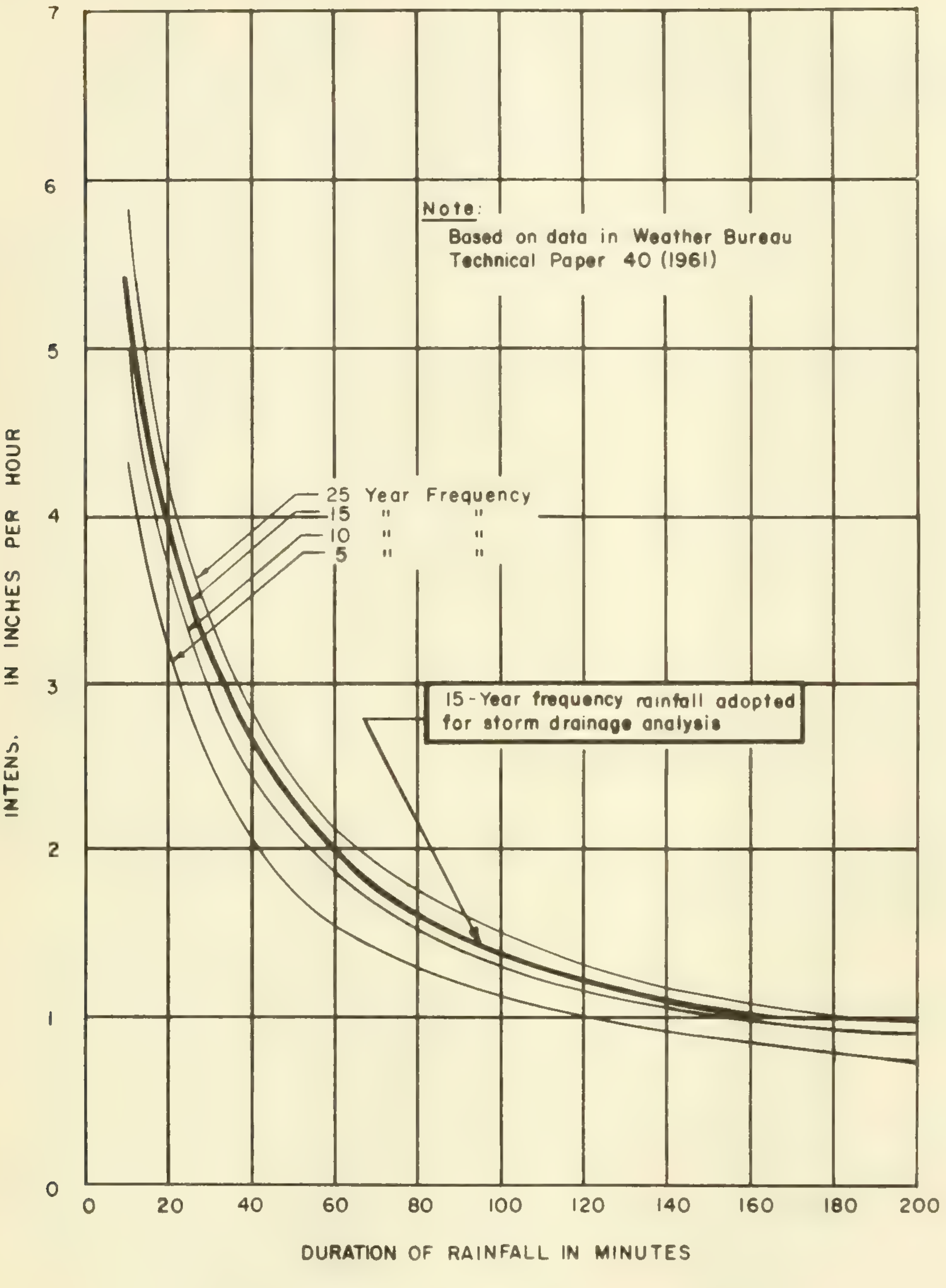
Peak Demand 1975, MGD		Distribution To Sewer System		Capacity of Sewer System (a)
Project area	(0.8)	St. James Sanitary	(0.5)	2.25
Tributary area	(4.2)	Combined Sewer under Public Garden	(4.5)	9.0
	5.0		5.0	11.25

(a) Capacity is based on dry weather conditions

TABLE 2-III

1975 Tributary Area Populations and Demands

Functional User	Population	Daily Demand, MGD
Residential:		
Apartments	4,875	0.731
Employment:		
Retail, Office Hotel & Schools	12,055	0.482
Transients:		
Shoppers & Business	1,200	0.024
Hotel Guests	1,000	0.150
Total Population:	19,130	
Average Daily Demand, MGD:		1.387
Peak Daily Demand, MGD:		4.2



INTENSITY-DURATION RAINFALL CURVES FOR BOSTON, MASSACHUSETTS

SOURSE: CITY OF BOSTON REPORT ON "IMPROVEMENTS TO THE BOSTON MAIN DRAINAGE SYSTEM" BY CAMP, DRESSER AND MCKEE, INC. SEPTEMPER 1967.

EXHIBIT 2-13

1975 BASE SOCIAL POLITICAL ENVIRONMENTAL PARAMETERS

The following social political environmental parameters would be affected by the first four phases of development activity of the Park Plaza project:

SUB COMPONENT/PARAMETER		STATUS
Demographic Structure:		
S01	Population size	Building Study Stage
S02	Population density	Building Study Stage
S03	Population distribution	Building Study Stage
S04	Age characteristics	Building Study Stage
S05	Sex characteristics	Building Study Stage
S06	Ethnic composition	Building Study Stage
S07	Marital status	Building Study Stage
S08	Occupational characteristics	Building Study Stage
S09	Income characteristics	Building Study Stage
S10	Health/education level	Building Study Stage
S11	Family structure	Building Study Stage
S12	Family size character	Building Study Stage
Group Structure:		
S13	Institution type	Defer to Design Dev. Stage
S14	Institution size	Defer to Design Dev. Stage
S15	Institution character	Defer to Design Dev. Stage
Political Structure:		
S16	Political district	Building Study Stage
S17	Political composition	Building Study Stage
Functional Services:		
S18	Educational system	Deleted
S19	Educational capacity	Defer to Design Dev. Stage
S20	Health services system	Deleted
S21	Health services capacity	Deleted
S22	Social services system	Deleted
S23	Social services capacity	Defer to Design Dev. Stage
S24	Police protection system	Deleted
S25	Police protection capacity	Defer to Design Dev. Stage
S26	Fire protection system	Deleted
S27	Fire protection capacity	Defer to Design Dev. Stage
S28	Emergency system	Deleted
S29	Emergency capacity	Defer to Design Dev. Stage
S30	Parks and recreation system	Building Study Stage
S31	Parks and recreation capacity	Defer to Design Dev. Stage
S32	Cultural services system	Defer to Design Dev. Stage

SOCIAL-POLITICAL

Demographic Structure - S1-12

For a description of the population size and other demographic characteristics of the neighborhoods surrounding the project area, refer to the "Neighborhood Descriptions" section of the General Social-Political Environmental Base.

Park Square : Project Area

The Park Square area today houses a very small number of households. According to a BRA Relocation Survey, there were 30 residents within the project area in 1973. The transient nature of the area is shown by the fact that only 35 percent of the households have remained in the area for more than two years. Because of the nature of Park Square, there is rarely more than one child or one resident over 65 years old.

Although incomes in Park Square are generally low, only one or two households would be eligible for public housing. The prevailing occupations are student and waitress. Two or three residents are professionals, however, and two or three are administrators.

Households in Park Square are smaller than elsewhere in downtown, with an average size of 1.4 persons. Half of them are one-person households.

Group Structure - S13-15

There are a variety of private social service agencies within the downtown as well as public welfare offices and religious organizations (Refer to Community Facilities maps in the General Social-Political Environmental Base section).

Within the project area itself, there are these service organizations:

- Seamen's Friends Society (a small hotel for visiting foreign seamen, which is church affiliated and endowed, and now occupies 20,000 sq.ft. on Park Square).

- Women's Educational and Industrial Union (a women's non-profit organization occupying 32,000 sq.ft. in three buildings along Boylston Street with a small arts and crafts retail shop and approximately 60 employees. Indications are that the WEIU may be relocating, voluntarily, within the near future.)

- Massachusetts Law Reform Institute

- Lawyers' Commission for Civil Rights

- Al-Anon Intergroup Council

Social-Political

Political Structure - S 16, 17

The project area is within the following political jurisdictions:

Political party representation: Precinct 1
State Representative: Ward 5 (5th, Suffolk)
State Senate: 2nd, Suffolk
US House of Representatives: 8th District

Ward 5 includes all or part of these communities: Beacon Hill, Bay Village, South End and Back Bay.* The adult population within Ward 5 is 38,371, 49 percent of this total, or 18,768 are actually registered voters (as of 1972). Women represent 56 percent of the adult population and 57 percent of the registered voters. The actual votes cast on November 7, 1972 was 13,861, or 73 percent of those eligible. (Seventy-eight percent of the votes cast in the September 1972 State primary were Democratic).

Voting records indicate that in Precinct 1, there are 3,709 residents on the Election List, with 1934 registered voters. No Precinct within the City exceeds 3,500 registered voters.

* The actual boundaries are: Granby, Charles River, Cambridge, Irving, Myrtle, Bowdoin, Beacon, Park, (Tremont, Shawmut, Dover, Tremont, Clarendon, Columbus, Berkeley) Beacon, through Fens, Kilmarnock, Brookline, Turnpike, Blandford, Commonwealth, to beginning.

Functional Services - S18-32

The description of existing functional services for the project site and surrounding area is deferred to the 1985 base year. The explanation for this is that this component of the environment is primarily affected by new or additional demands for services by the project's population which will not fully occupy the project until 1985. On the other hand the change in demand for services due to the relocation of 30 project area residents and several hundred employees in 1975 represents a relatively minor impact on the 1975 base.

1975 BASE ECONOMIC ENVIRONMENTAL PARAMETERS[*]

The following economic environmental parameters would be affected by the first four phases of the Park Plaza project development process:

SUB COMPONENT/PARAMETER	STATUS
Public Economic Structure:	
E01 Taxable property value	Building Study Stage
E02 Real property tax rate	Building Study Stage
E03 Property tax revenue	Building Study Stage
E04 Non-property tax revenue	Building Study Stage
E05 User fee revenue	Building Study Stage
E06 Intergovt. transfer revenue	Building Study Stage
E07 Other revenue	Building Study Stage
E08 Bonded debt	Building Study Stage
E09 Debt margin	Building Study Stage
E10 Debt service costs	Building Study Stage
E11 Public housing capital investment	Building Study Stage
E13 Relocation subsidy expense	Building Study Stage
E15 Education operating expense	Building Study Stage
E17 Health service operating expense	Building Study Stage
E19 Social service operating expense	Building Study Stage
E21 Police protection operating exp.	Building Study Stage
E23 Fire protection operating exp.	Building Study Stage
E25 Emergency system operating exp.	Building Study Stage
E26 Park and recreation capital inv.	Building Study Stage
E27 Park and recreation operating exp.	Building Study Stage
E28 Cultural services capital inv.	Building Study Stage
E29 Cultural services operating exp.	Building Study Stage
E30 Solid waste mgmt capital inv.	Building Study Stage
E31 Solid waste mgmt operating exp.	Building Study Stage
E32 General govnmt service cap. inv.	Building Study Stage
E33 General govnmt service oper. exp.	Building Study Stage
E34 Water supply capital investment	Building Study Stage
E35 Water supply operating expense	Building Study Stage
E36 Sanitary sewer capital inv.	Building Study Stage
E37 Sanitary sewer operating exp.	Building Study Stage
E38 Storm drain capital investment	Building Study Stage
E39 Storm drain operating expense	Building Study Stage
E40 Public signal system cap. inv.	Building Study Stage
E41 Public signal system oper. exp.	Building Study Stage
E42 Public transit system cap. inv.	Building Study Stage
E43 Public transit system oper. exp.	Building Study Stage
E44 Other transport system cap. inv.	Building Study Stage
E45 Other transport system oper. exp.	Building Study Stage

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[*] For a description of these economic paremeters, refer to the 1985 base description and Chapter V, The Project Alternatives.

SUB COMPONENT/PARAMETER		STATUS
Private Economic Structure:		
E46	Capital investment land	Building Study Stage
E47	Capital investment buildings	Building Study Stage
E48	Capital investment fixed equipmt	Building Study Stage
E49	Disposable personal income	Building Study Stage
E50	Rental-lease income	Building Study Stage
E51	Sales income	Building Study Stage
E52	Interest income	Building Study Stage
E53	Rental-lease expenses	Building Study Stage
E54	Payroll expenses	Building Study Stage
E55	Utility service expenses	Building Study Stage
E56	Inventory expenses	Building Study Stage
E57	Tax expenses	Building Study Stage
E58	Interest expenses	Building Study Stage
E59	Operation and maintenance exp.	Building Study Stage

THE 1980 ENVIRONMENTAL BASE ANALYSIS MODEL

PURPOSE

The 1980 Environmental Base Analysis (EBA) Model reflects the conditions of the site and surrounding environs at the point at which buildings have been cleared but construction has not yet begun. It is used as a means for determining the impacts of the basic construction phases - excavation and site preparation, and construction of new development.

The 1980 base consists of only those parameters affected by excavation (PHASE E) and construction (PHASE F) which

a - were not previously included in the 1975 base, and

b - those relevant 1975 base parameters and new 1980 base parameters which are predicted to change by 1980 as a result of actions and/or influences other than the Park Plaza project.

For example, the impact of the construction of Park Plaza on

storm drainage capacity would be measured in terms of the system capacity as it is projected to be in 1980 without Park Plaza. However, between 1975 and 1980, there may be improvements in the sotrm drainage system serving the project area which are made, not because of Park Plaza, but because of other developmental decisions. The 1975 base storm drainage capacity, therefore, would not represent an accurate threshold for measuring impact.

1980 ENVIRONMENTAL BASE CONDITIONS AFFECTED

	PHASE	
	E EXCAVATION	F CONSTRUCTION
Natural Physical Environment		
1 LAND FORM	1,2	
2 BEDROCK GEOLOGY	2,3	2,3
3 SURFICIAL GEOMORPHOLOGY	1,2,3	2,3
4 AIR RESOURCES	2,3	2,3
5 CLIMATE	2,3	2,3
6 SURFICIAL HYDROLOGY	2,3	2,3
7 SUBSURFACE HYDROLOGY	2,3	3
8 VEGETATIVE RESOURCES	1,2,3	1,2,3
9 FAUNAL RESOURCES	1,2,3	2,3
Built Physical Environment		
10 PERCEPTUAL ENVIRONMENT	2,3	2,3
11 LAND USE		3
12 BUILT CHARACTER	2,3	1,2,3
13 CIRCULATION	2,3	1,2,3
14 UTILITIES	2,3	1,2,3
Social Political Environment		
15 DEMOGRAPHIC STRUCTURE	1, 3	3
16 GROUP STRUCTURE		
17 POLITICAL STRUCTURE		
18 FUNCTIONAL SERVICES	2,3	1,2,3
Economic Environment		
19 PUBLIC ECONOMIC STRUCTURE	2,3	1,2,3
20 PRIVATE ECONOMIC STRUCTURE	1,2,3	1,2,3

1 = FIRST ORDER, DIRECT IMPACT
2 = SECOND ORDER, INDIRECT IMPACT
3 = THIRD ORDER, INDIRECT IMPACT

1980 BASE NATURAL PHYSICAL ENVIRONMENT PARAMETERS

The following natural physical environment parameters would be affected by excavation and construction activities of the Park Plaza development process:
*indicates parameter updated from 1975 Base.

SUB COMPONENT/PARAMETER		STATUS
Land Form:		
N01	Topography	Deferred to Des. Dev. Stage
N02	Slope	Deferred to Des. Dev. Stage
Bedrock Geology:		
N07	Bedrock strength	Deferred to Des. Dev. Stage
N08	Seismic stability	Deferred to Des. Dev. Stage
N09	Faults and fractures	Deferred to Des. Dev. Stage
N11	Rock aquifer locations	Deferred to Des. Dev. Stage
Surficial Geomorphology:		
N17	Soil depth	Deferred to Des. Dev. Stage
N19	Soil permeability/erodibility	Deleted
N20	Soil bearing capacity	Deferred to Des. Dev. Stage
Air Resources:		
N22	Air pollutant level	Deleted
N23	Air pollutant type	Deleted
Climate:		
N25	Air temperature	Deleted
N27	Humidity	Deleted
N28	Snow accumulation	Deferred to Des. Dev. Stage
N29	Wind direction	Building Study Stage
N30	Wind speed	Building Study Stage
N32	Solar exposure	Building Study Stage
N33	Evaporation/transpiration	Deleted
Surficial Hydrology:		
N36	Drainage area	Deleted
N38	Flow rate	Deleted
N39	Volume/capacity	Deleted
N40	Residence time	Deleted
N41	Temperature	Deleted
N44	Color	Deleted
N45	Turbidity	Deleted
N49	Mineral level	Deleted
N51	Odor	Deleted

SUB COMPONENT/PARAMETER	STATUS
Subsurface Hydrology:	
N54 Water table depth	Deferred to Des. Dev. Stage
N55 Water table contour	Deferred to Des. Dev. Stage
N56 Aquifer/well yield	Deleted
N57 Lateral flow rate	Deferred to Des. Dev. Stage
Vegetative Resources:	
N63 Species	Deleted
N64 Quantity	Deleted
N65 Community/Seres	Deleted
N66 Area	Deleted
N67 Size	Deleted
N68 Form	Deleted
N69 Color	Deleted
N70 Texture	Deleted
N71 Fruit	Deleted
N72 Age	Deleted
N73 Condition	Deleted
N74 Uniqueness	Deleted
Faunal Resources:	
N76 Population density	Deleted
N78 Habitat	Deleted
N79 Food	Deleted
N80 Residence duration	Deleted
N81 Condition	Deleted
N82 Uniqueness	Deleted

CLIMATE

Climate parameters are identical with those identified for the 1975 Base. Although there will be minor changes in micro climate resulting from demolition, the essential base for the comparison of project impacts is the existing condition (1975) rather than the interim climate conditions following demolition.

1980 BASE BUILT PHYSICAL ENVIRONMENT PARAMETERS

The following built physical environment parameters would be affected by excavation and construction activities of the Park Plaza development process:

SUB COMPONENT/PARAMETER		STATUS
Perceptual Environment:		
B01	Sound level	Deferred to Des. Dev. Stage
B02	Sound quality	Deferred to Des. Dev. Stage
B03	Vibration level	Deferred to Des. Dev. Stage
B04	Vibration quality	Deferred to Des. Dev. Stage
B05	Scenic vistas	Deferred to Des. Dev. Stage
Land Use:		
B07	Land use area	Deleted
Built Character:		
B09	Structural coverage	Building Study Stage
B10	Structural height	Building Study Stage
B11	Floor area	Building Study Stage
B12	Spatial form	Building Study Stage
B13	Visual character (macro)	Building Study Stage
B14	Day profile	Building Study Stage
B15	Night profile	Building Study Stage
B16	Visual character (micro)	Deferred to Des. Dev. Stage
B17	Structural condition	Deferred to Des. Dev. Stage
B18	Site amenities	Deferred to Des. Dev. Stage
B19	Unique structures	Building Study Stage
B20	Unique quality	Building Study Stage
B21	Archeologic features	Building Study Stage
Circulation*:		
B22	Highway system	Building Study Stage
B23	Highway capacity	Building Study Stage
B24	Parking system	Building Study Stage
B25	Parking capacity	Building Study Stage
B26	Service access	Building Study Stage
B27	Pedestrian system	Building Study Stage
B28	Pedestrian capacity	Building Study Stage
B29	Public transit system	Building Study Stage
B30	Public transit capacity	Building Study Stage
B32	Rail transport capacity	Building Study Stage
B34	Air transport capacity	Deleted
B36	Water transport capacity	Deleted

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* For a description of these conditions, refer to the 1985 Built Physical Base

SUB COMPONENT/PARAMETER	STATUS
Utilities:*	
B37 Power supply system	Building Study Stage
B38 Power supply capacity	Building Study Stage
B39 Water supply system	Building Study Stage
B40 Water supply capacity	Building Study Stage
B41 HIgh pressure water system	Building Study Stage
B42 High pressure water capacity	Building Study Stage
B43 Fuel supply system	Building Study Stage
B44 Fuel supply capacity	Building Study Stage
B45 Telephone system	Building Study Stage
B46 Telephone capacity	Building Study Stage
B47 Public signal system	Building Study Stage
B48 Public signal capacity	Building Study Stage
B49 Sanitary sewer system	Building Study Stage
B50 Sanitary sewer capacity	Building Study Stage
B51 Storm drain system	Building Study Stage
B52 Storm drain capacity	Building Study Stage

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* For a description of these conditions, refer to the 1985 Built Physical Base

SOUND AND VIBRATION

Base Reference

The general level and quality of sound and vibration on and around the site area is the base setting for changes which would result from excavation and construction activities. These activities are somewhat controllable and a result of the particular construction strategy rather than the program of the project, in terms of the kinds of equipment used and the phasing of construction operations. Thus, the sound and vibration base setting is deferred until the design testing phase.

B05 SCENIC VISTAS

Base Definition and Significance

A scenic vista is a defined view of a major open space or prominent historic site, from within the site area. Scenic vistas provide a spatial reference for the visitor and resident; they represent a means by which the urban area is more comprehendible, more human in scale.

Base Description

There are three scenic vistas including views of the Armory, the Common and Garden and the vista of the Park Street Church. These views, as indicated on the "Unique Structures" map, may be affected (blocked or partially blocked) by site preparation, excavation or construction activities. Although these vistas, or sequence vista, in the case of the views of the Common and Garden from Columbus Avenue and Park Square, are not the result of one concerted plan (e.g., Government Center), they are positive elements in that they incorporate historic or cultural landmarks and regional open space elements. All of these vistas are "accessible" to the

pedestrian and the vehicular commuter, with perhaps the vehicular reference being the more dynamic but less detailed viewpoint.

Resource Strengths and Weaknesses

Although the "subject" of scenic vistas are specific sites (e.g., Park Street Church), the vistas of these areas are broad; some "narrowing" of the vistas could occur without total loss of the view.

Thresholds or Limits to Change

Since some or all of the vistas may only be partially blocked, either temporarily by construction barricades, or permanently by construction, the degree to which these views are blocked represents the mechanism for evaluating development schemes. Further, the new construction may add scenic vistas or viewpoints which are not now available, representing an "addition" to the base condition.

Thus, the scale of potential impact is a relative one, with the possibility of vistas being "replaced" by new visual

references, with the exception of the Columbus Ave. visual corridor, which is a specified easement in the Park Plaza Urban Renewal Plan. To the extent that an existing view or vista is blocked, a "negative" impact occurs, while the addition of a vista represents a "positive" impact. In conclusion, the threshold associated with changes caused by new construction is that the new project should at least not decrease the "visual accessibility" or opportunity to see unique sites and structures in the surrounding area.

BUILT CHARACTER

B09 STRUCTURAL COVERAGE

B10 STRUCTURAL HEIGHT

B11 FLOOR AREA

B12 SPATIAL FORM

B14 DAY PROFILE

B15 NIGHT PROFILE

B16 VISUAL CHARACTER (MACRO-MICRO)

B17 STRUCTURAL CONDITION

B18 SITE AMENITIES

The 1975 base description is to be used as the base for 1980.

B19 UNIQUE STRUCTURES

B20 UNIQUE QUALITY

Base Description and Significance

The unique quality of the site itself and of neighboring areas may only be indirectly affected by construction activities; once demolition activities are concluded, subsequent actions can affect unique quality only through:

1. Structural conditions changes as a result of subsurface changes brought on by substructure construction;

2. "Image" changes as a result of micro climate changes (wind, solar exposure) brought on by superstructure construction.

The key aspect of defining the limits of change is the susceptibility of the site and environs to changes in structural conditions (as defined by subsurface hydrologic and geologic patterns) and image.

Despite the growth of Boston and the replacement of old historic development with another, the downtown area has retained some artifacts from every period since the early seventeenth century. The Unique Quality map indicates the breadth of historic resources still remaining.

The most obvious problem central Boston faces is how to conserve historic residential neighborhoods by the Beacon Hill, Back Bay and South Cove districts when there is growing economic pressure toward commercial development in these areas. Back Bay residential neighborhoods have given way to institutional properties, condominiums and apartments. South Cove has lost one third of its remaining historic residential areas from 1925 to 1950 alone to commercial pressure and urban renewal.

Areas such as Park Square do not have as strong an image as Beacon Hill or Back Bay districts, thus making it vulnerable to economic forces. Absent are the concentrated elements that are needed to tie a neighborhood together. Such elements as uniform heights and facades, unique cornices and window/door treatments are not consistent throughout the area. There are no on-site parcels or buildings on the National Register. By compar-

ison, areas such as the Beacon Hill, Back Bay areas and unique areas such as the Common and its surrounding physical development add vitality to central Boston.

Beacon Hill displays a strong image for the following reasons:

- It is situated on the last of the original hills in the city - even the topography is noteworthy;
- Building scale is intimate - row house type, three-four story tall average;
- Intimate pedestrian street character;
- Its visual exposure to the Common takes on a symbiotic relationship;
- Thematic elements such as wide sidewalks, inset doorways, ornamental wrought iron, trees, and doorways make this a unique area;
- Established residential identity in the center of the city.

Back Bay district displays a strong image for the following reasons:

- Classic gridiron street pattern;

- Each street has its own distinct character;
- Pedestrian/human scale is evident;
- Use of rich materials is typical;
- Landscaping.

All of the structures are not totally historic in nature. It is the way they tie together as listed in the above reasons that make them unique.

The Common and Garden, indicated on the 200 scale Unique Quality map, exhibit a strong image for the following reasons:

- The Boston Common and Public Garden, probably two of the most well known urban parks in the Unites States, represent the focus for two of the most prominent residential areas, the Beacon Hill and Back Bay districts. While any of these areas by themselves represent a unique urban environment, in combination they constitute an enormous community asset.
- The human scale of the Park and the surrounding physical development is evident. It is unique for a city center. The skyline profile is low, residential in character.

- o A strong visual corridor running north along Columbus Avenue focuses on the Common and concentrated group of national historic sites.

Thresholds or Limits to Change

Probably the clearest threshold in relation to maintaining unique or historic value is that which relates to structural conditions. Since long-term structural deterioration may be result in eventual "condemnation" of a building, potentially dangerous subsurface conditions must be avoided. Thus, the structural condition limit for unique quality areas, including subsurface drainage, must be set at that point where there is a discernible damaging effect.

In terms of image-related change as caused by wind and solar condition, this would limit the base area to the Common and Garden. Presumably, increased building shadows and turbulent winds tend to detract from the Common and Garden as unique pedestrian spaces, but precise calculations of such changes are impossible. We do know that physical and psychological images are composed of more discernible characteristics:

- Location of Park in relation to general urban pattern and other land use;
- Pedestrian accessibility and comfort;
- Amount, variety and quality of plant materials;
- Level of maintenance;
- Overall design quality - circulation, natural features, etc.

Of those aspects listed above, only pedestrian comfort and vegetative conditions are directly affected by micro-climate and/or subsurface changes. Thus, it is proposed that image changes be assessed by a composite, relative measurement of wind, shadow and related vegetative and pedestrian effects.

B21 ARCHEOLOGIC FEATURES

Base Definition and Significance

Excavation activities may expose archeologic features within the site area; subsequent construction activities may affect the condition of those features.

Base Description

There is no direct evidence of archeologic resources within the site area. Since the site lies in an area of the pre-colonial shoreline (see "Unique Quality" map), the possibility of archeologic resources exists.

Resource Strengths and Weaknesses

There are no inherent strengths and weaknesses.

Thresholds or Limits to Change

A basic criteria for archeologic resources is a continuous monitoring of excavation and construction activi-

ties, supplemented by a determination of resource value, and preseration strategy if necessary. To the extent that such procedures are carried out in a continuous organized way, the larger development scheme may represent a greater opportunity for gaining and preserving archeologic resources, since the larger schemes involve greater areas of excavation. The "limits to change" in archeologic resources would be physical damage to those resources.

1980 BASE SOCIAL POLITICAL ENVIRONMENTAL PARAMETERS

The following social political environmental parameters would be affected during the excavation and construction phases of the Park Plaza project development process:

SUB COMPONENT/PARAMETER	STATUS
Demographic Structure:	
S01 Population size	Defer to Development Phase
S04 Population age character	Defer to Development Phase
S05 Population sex character	Defer to Development Phase
S06 Ethnic composition	Defer to Development Phase
S08 Occupational character	Defer to Development Phase
S09 Income character	Defer to Development Phase
S10 Health level	Defer to Development Phase
Functional Services:	
S19 Educational capacity	Defer to Development Phase
S25 Police protection capacity	Defer to Development Phase
S27 Fire protection capacity	Defer to Development Phase
S29 Emergency capacity	Defer to Development Phase
S30 Parks and recreation system	Defer to Development Phase
S31 Parks and recreation capacity	Defer to Development Phase
S32 Cultural services system	Defer to Development Phase
S33 Cultural services capacity	Defer to Development Phase
S35 Solid waste management capacity	Defer to Development Phase
S36 General govt. services system	Defer to Development Phase
S37 General govt. services capacity	Defer to Development Phase

1980 BASE ECONOMIC ENVIRONMENT PARAMETERS*

The following economic environment parameters would be affected during the excavation and construction phases of the Park Plaza project development process:

SUB COMPONENT/PARAMETER		STATUS
Public Economic Structure:		
E01	Taxable property value	Building Study Stage
E02	Real property tax rate	Building Study Stage
E03	Property tax revenue	Building Study Stage
E04	Non-property tax revenue	Building Study Stage
E05	User fee revenue	Building Study Stage
E06	Intergovt transfer revenue	Building Study Stage
E08	Bonded debt	Building Study Stage
E11	Public housing capital investment	Building Study Stage
E13	Housing construction subsidy exp.	Building Study Stage
E21	Police protection oper. expense	Building Study Stage
E23	Fire protection operating exp.	Building Study Stage
E25	Emergency service oper. expense	Building Study Stage
E26	Park and recreation cap. inv.	Building Study Stage
E27	Park and recreation oper. exp.	Building Study Stage
E28	Cultural services cap. inv.	Building Study Stage
E29	Cultural services oper. exp.	Building Study Stage
E31	Solid waste management oper. exp.	Building Study Stage
E32	General govt. services cap. inv.	Building Study Stage
E33	General govt. services oper. exp.	Building Study Stage
E34	Water supply capital investment	Building Study Stage
E35	Water supply operating expense	Building Study Stage
E36	Sewer system capital investment	Building Study Stage
E37	Sewer system operating expense	Building Study Stage
E38	Storm drain capital investment	Building Study Stage
E39	Storm drain operating expense	Building Study Stage
E40	Public signal system cap. inv.	Building Study Stage
E41	Public signal system oper. exp.	Building Study Stage
E42	Public transit system cap. inv.	Building Study Stage
E43	Public transit system oper. exp.	Building Study Stage
E44	Other transportation cap. inv.	Building Study Stage
E45	Other transportation oper. exp.	Building Study Stage
Private Economic Structure:		
E47	Capital investment buildings	Building Study Stage
E48	Capital investment fixed equip.	Building Study Stage
E49	Disposable personal income	Building Study Stage
E50	Rental lease income	Building Study Stage
E51	Sales income	Building Study Stage

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* For a description of these economic parameters, refer to the 1985 base description and Chapter V, The Project Alternatives.

SUB COMPONENT/PARAMETER		STATUS
E52	Interest income	Building Study Stage
E54	Payroll expenses	Building Study Stage
E55	Utility services expenses	Building Study Stage
E56	Inventory expenses	Building Study Stage
E57	Tax expenses	Building Study Stage
E58	Interest expense	Building Study Stage
E59	Operation and maintenance exp.	Building Study Stage

THE 1985 ENVIRONMENTAL BASE ANALYSIS MODEL

PURPOSE

The 1985 Environmental Base Analysis (EBA) Model is similar to the 1980 Base in that it represents an assessment of critical environmental conditions and characteristics which are predicted to change by 1985 without the influence of Park Plaza. It also includes those 1975 and 1980 base parameters which represent "existing conditions" as required for the testing of the impacts of occupancy and use of the project.

1985 ENVIRONMENTAL BASE CONDITIONS AFFECTED

	PHASE G OCCUPANCY/USE
Natural Physical Environment	
1 LAND FORM	
2 BEDROCK GEOLOGY	
3 SURFICIAL GEOMORPHOLOGY	2,3
4 AIR RESOURCES	2,3
5 CLIMATE	2,3
6 SURFICIAL HYDROLOGY	2,3
7 SUBSURFACE HYDROLOGY	3
8 VEGETATIVE RESOURCES	1,2,3
9 FAUNAL RESOURCES	1,2,3
Built Physical Environment	
10 PERCEPTUAL ENVIRONMENT	2,3
11 LAND USE	1,2
12 BUILT CHARACTER	2,3
13 CIRCULATION	1,2,3
14 UTILITIES	1,2,3
Social Political Environment	
15 DEMOGRAPHIC STRUCTURE	1,2,3
16 GROUP STRUCTURE	2
17 POLITICAL STRUCTURE	2,3
18 FUNCTIONAL SERVICES	1,2,3
Economic Environment	
19 PUBLIC ECONOMIC STRUCTURE	2,3
20 PRIVATE ECONOMIC STRUCTURE	1,2,3

1 = FIRST ORDER, DIRECT IMPACT
2 = SECOND ORDER, INDIRECT IMPACT
3 = THIRD ORDER, INDIRECT IMPACT

1985 BASE NATURAL PHYSICAL ENVIRONMENT PARAMETERS

The following natural physical envirnment parameters would be affected by occupancy and use of the completed Park Plaza project:

SUB COMPONENT/PARAMETER	STATUS
Surficial Geomorphology:	
N18 Soil texture	Deleted
N19 Soil permeability	Deleted
Air Resources:	
N22 Air pollutant level	Deferred to Des. Dev. Stage
N24 Air pollutant odor	Deferred to Des. Dev. Stage
Surficial Hydrology:	
N40 Residence time	Deferred to Des. Dev. Stage
N41 Temperature	Deferred to Des. Dev. Stage
N42 Dissolved Oxygen	Deferred to Des. Dev. Stage
N46 Biochemical oxygen demand	Deferred to Des. Dev. Stage
N47 Coliform level	Deferred to Des. Dev. Stage
N48 Nutrient level	Deferred to Des. Dev. Stage
N51 Odor	Deferred to Des. Dev. Stage
Vegetative Resources:	
N63 Species	Deleted
N64 Quantity	Deleted
N65 Community/seres	Deleted
N69 Color	Deleted
N71 Fruit	Deleted
N73 Condition	Deleted
Faunal Resources:	
N75 Species	Deleted
N76 Population density	Deferred to Des. Dev. Stage
N77 Territorial requirement	Deferred to Des. Dev. Stage
N78 Habitat	Deferred to Des. Dev. Stage
N79 Food	Deferred to Des. Dev. Stage
N80 Residence duration	Deferred to Des. Dev. Stage
N81 Condition	Deferred to Des. Dev. Stage

1985 BASE BUILT PHYSICAL ENVIRONMENTAL PARAMETERS

The following built physical environment parameters would be affected by the occupancy and use of the completed Park Plaza project:

SUB COMPONENT/PARAMETER	STATUS
Perceptual Environment:	
B01 Sound level	Deferred to Operational Stage
B02 Sound quality	Deferred to Operational Stage
B03 Vibration level	Deferred to Operational Stage
Land Use:	
B06 Land use type	Building Study Stage
B08 Land use distribution	Deferred to Des. Dev. Stage
Built Character:	
B13 Visual character (macro)	Deleted
B15 Night profile	Building Study Stage
B16 Visual character (micro)	Deferred to Des. Dev. Stage
B17 Structural condition	Deferred to Operational Stage
B20 Unique quality	Deferred to Des. Dev. Stage
Circulation:	
B23 Highway capacity	Building Study Stage
B25 Parking capacity	Building Study Stage
B26 Service access	Building Study Stage
B28 Pedestrian capacity	Building Study Stage
B30 Public transit capacity	Building Study Stage
B32 Rail transport capacity	Building Study Stage
B34 Air transport capacity	Deleted
B36 Water transport capacity	Deleted
Utilities:	
B38 Power supply capacity	Building Study Stage
B40 Water supply capacity	Building Study Stage
B42 High pressure water capacity	Building Study Stage
B44 Fuel supply capacity	Building Study Stage
B46 Telephone capacity	Building Study Stage
B48 Public signal capacity	Building Study Stage
B50 Sanitary sewer capacity	Building Study Stage

LAND USE B.06

Base Definition and Significance

The scale of land use impact for the occupancy phase (1985) is Central Boston; the new Park Plaza project represents a major addition of activities, not only to the immediate surrounding area, but also to the downtown. The Park Plaza study area is a critical part of the existing land use pattern in central Boston, occupying as it does a focal position - between the old established Central Business District and expanding commercial activity of Back Bay; beside the City's premier open space, the Common and Public Garden, in turn a direct neighbor of well entrenched, historic and environmentally vulnerable residential zones - Back Bay and Beacon Hill; and finally in close proximity to small, isolated but distinctive enclaves - Bay Village and Chinatown, for example.

In a planning process, separate land use areas are often extracted from the milieu for individual analysis and action - yet each part affects the other - each is the other and the whole is the land use pattern of central

Boston. This pattern is in constant flux - changing thence to a future identity. While the pattern is subject to constant change, some of the land uses are more permanent and stable than others. This distinction allows identification of the land use impact that a changing Park Plaza will have on the pattern - in terms of its effect on established, stable uses and on its coordination with more unstable areas of change.

Base Description

The land use composition of which Park Plaza forms a part extends over much of central Boston - north to the Charles River and Beacon Hill; east over the Central Business District; south to the highway cut which effectively separates South Boston from the central district and west for an arbitrary distance through the geometry of Back Bay.

This composition is shown on the map, "Community Areas", and defined in more detail below.

These are two primary ingredients - residential and commercial - and one unifying element, the great open space of the Common and Public Garden.

1. Residential

The residential land use in Boston Bay (population 15,000), Beacon Hill (population 9,000), South Cove (population approximately 4,000), enjoy no doubt some established character, recognized by current planning policies. The type of housing and, therefore, the composition of the resident population may change, but it is likely that these areas will not only retain their residential identity but experience growth - with conversion of older units to higher density and new development, especially in South Cove.

2. Commercial

This use includes a mix of governmental, retail, office, institutional, etc., and includes two sub-areas - the Central Business District/ Governmental Center and Back Bay Commercial.

a. The Central Business District extends east and northeast of the study site. The potential for change in this area varies,

and can be described generally as unstable in Park Plaza and in the entertainment district east. It is more stable and fixed as one proceeds toward the City Hall and Government Center areas recently established.

b. Commercial activity dominates the land use west of Park Plaza, extending as a spine from the Public Garden (Arlington Street) west to Massachusetts Avenue - about one mile, and bounded on the south by the Massachusetts Turnpike extension, and north by Commonwealth Avenue. As in recent years, this area today is the site of much change in character as a sophisticated commercial center. Its character (insurance companies to discotheques) is reinforced as residential use moves out or is relegated to isolated concentrations in high rise structures.

Together the commercial land use of central Boston is seen as an interlacing of old and new along a spine anchored in the Central Bus-

iness District by extending out to a more open business district in Back Bay. This spine is identified as a land use inherently in flux - development, exploitation, decline, delapidation, demolition, renewal - all set in motion by the dynamics of free enterprise and the desire to realize the highest return on the land resources provided for this activity.

3. Open Space

Certainly the most established land use in the central district and the one most likely to retain its present identity is the Common and Public Garden. Its significance can be appreciated on many levels, but primarily to its future is the role it plays as a vital extension of the residential life in central Boston vis-a-vis its more superficial relation to the human spin-off of adjacent commercial activity. In the first case we have a functional link - open space as an integral part of home environment, while its relation to office workers, hotel guests, tourists, etc.,

is more on the order of an amenity link. The positive future of the Common is critically tied to the health of its neighborhood context.

Finally, these open space areas provide the context which allows a cumulative statement of residential life not possible from separate neighborhoods. This is of immeasurable importance to the life of Boston and forms the real significance of the Common and Public Garden as statements of environmental base.

Threshold

The impact on the land use context of central Boston, inherent in the various development schemes for Park Plaza can only be subjectively defined. There is no possible way to precisely measure the quality of this impact as is the case with other environmental factors. Nor can we define a scientific threshold over which impact becomes an unacceptable burden on the existing positive character of the city. Still, despite its subjective nature this impact is very important to the quality of central Boston. The land

use pattern frames and articulates the preservation of historic features, sets the scale of the built physical environment, and defines the balance between stable residential population and more unstable commercial use which in many ways defines the city's personality and character. The land use of the city center is directly reflective of the use of the city center.

Today, that use is recognized as a positive one primarily because residential life remains a primary asset. The center of Boston, unlike many other American cities of its size, retains a sizable resident population which promotes its image as a distinctively personal place to live, work and visit.

Because of its location amid the residential districts of the center and adjacent to the city's open space resources it is clear that development in Park Plaza will affect this character.

In terms of legal threshold, the following list of objectives are established by the Park Plaza Urban Renewal Plan[1].

1. Basic Objectives

The basic objectives of the Park Plaza Urban Renewal Plan are:

a. To provide a new "intown" residential community in the heart of the city;
b. To provide a higher economic use to replace an existing underutilized area;
c. To eliminate blighted conditions;
d. To increase the tax revenue by a more intensive development of the area;
e. To prevent the haphazard redevelopment of this important sector of Boston which would occur through unplanned renewal based upon the present street layout and pattern of privately-owned parcels.

2. Planning Objectives

Planning objectives include the following:

a. To provide a lively mixture of mutually reinforcing uses with emphasis on residential and daytime plus evening activity.

b. To carefully integrate, as to scale and activity, the new development with the surrounding areas - especially in the relationship of the buildings and uses along Boylston Street to the adjacent Boston Common and Public Garden.

c. To provide multilevel attractive and continuous pedestrian areas through the Project with maximum separation between vehicular and pedestrian movements and convenient interfacing with other transportation modes (transit, taxi, auto, pedestrian).

d. To eliminate excess and confusing roadways and replace them with an efficient, safe, and adequate new road system based on the overall proposed downtown traffic plan.

3. Building Design Objectives

The general design objectives are:

a. To create multi-use new structures, with the lower elements built close to the

street lines so as to maintain the urban character;

b. To provide a series of high-rise structures spaced apart as a continuation of the "high spine" of Boston.

c. To build with materials whose color and scale relate well to the existing Boston architecture of Back Bay, Beacon Hill, and Bay Village.

d. To create a new and pleasant environment within the public and semi-public areas to maximize the use of such areas and add a new dimension to the downtown commercial and entertainment areas.

(From Requirements Section)4

3. Land Use

The Project Area shall generally be devoted to residential, hotel, office, parking and commercial uses. Specific uses for each parcel are set forth in Item 6 of this Section. In each case, and unless specifically otherwise provided, designation of a particular use includes all accessory and ancillary uses customarily

or reasonably incident to the use specified or the use on an adjoining parcel.

These objectives are framed as permitted uses and bulk limitations for each parcel[2]. These are expressed on the map on the following page. The only stated minimum use specification is that more than 2,000 dwelling units (minimum of 2,001) will be developed as a "new intown community"[3]. Thus, one minimum threshold and a total maximum (for all uses) is specified in the Urban Renewal Plan. In terms of types of use, the plan emphasizes a number of aspects in relation to local obje - tives[5]:

1. More than 2,000 apartments as an "intown community";

2. High quality, modern cultural and entertainment facilities;

3. Separation of vehicular and pedestrian traffic - no specific mention of public transit;

4. Improvement of public utilities - no specific mention of public transit;

5. "Generous" allocation of public pedestrian areas, include protected shopping arcades, connections to subway stops and plazas.

As stated in the Urban Renewal Plan, the concept of reinforced residential uses, a mixture of pedestrian-oriented uses and a focus of economic vitality appear to be in conformity with current plans[6], but there are no specific measures to relate to alternate development programs, other than those described above.

B15 PROFILE - NIGHT

Base Definition and Significance

The only visual characteristic to be assessed as a base for the occupancy phase is "night profile", the illumination of the buildings and site, at the street level and as from a distance as skyline views. Both references are important indicators of urban character, of the amount of vitality and life in the Park Plaza area. It is from skyline views and the street character that much of a city's image is derived. The "Wall Street at Night" syndrome is a common reference to a deadened city center; a city's reputation for economic vitality, security, and hospitality are in many cases developed through a nighttime image.

The potential for significant changes in night profile exist at the onset of demolition activities and at the occupancy of the new project.

For this purposes of the Building Study Stage, the long-range, night skyline view can be "represented" by the "daytime" perspective drawings, at least in terms of

scale; the impact of the daytime view can be regarded as a reference for the night view. Presumably, if a new project were "unacceptable" under daytime conditions, that particular scheme wouldn't be enhanced by a night skyline "test".

Since demolition is an interim phase, the appropriate testing base for street level night profile are the conditions which exist today (1975).

Base Description

At the Street (Micro)

The level of street and building illumination is basically the result of the amount of street lighting and commercial entertainment uses. None of the existing streets have a uniform character, the only "spatial form" that comes from night illumination is the Stuart Street extension of entertainment uses from the "Combat Zone". By comparison, Boylston appears relatively deserted at night. The map, Land Use - 1975, indicates the amount of "active" street frontage, in terms of commercial uses open during the evening.

Thresholds or Limits to Change

In terms of limits to change caused by demolition, this is a function of time, the image impact of a "deserted" site. Since this issue can and should be handled by procedures during the design stage (construction barrier design, display, etc.), limits associated with demolition activities are not dealt with here.

As for ultimate changes caused by the new development, the Park Plaza Urban Renewal Plan, in support of general planning goals, recommends a pedestrian-oriented commercial development. It is probably safe to assume that the amount of existing street illumination represents a minimum threshold, not within the particular kinds of commercial uses involved, for new development. Since specific design guidelines are not available, this minimum can be expressed as the amount of nighttime commercial frontage that now exists, as a proportion of the total amount of street or right-of-way frontage available. This is seen as a "density" measure because the overall site intensity of night profile or illumination is more appropriate than merely the amount of "illuminated" frontage, since deserted frontage can detract from that image and since proposed development programs add new rights-of-way or malls. The map on the following page indicates the amount of commercial frontage active at

night expressed as a proportion of total street frontage (in feet). In terms of a maximum threshold, such a limit would be based on the possible impact of adjacent residential uses. Since few residential areas are directly adjacent to the site, an upper limit to night profile is not specified.

A. Time Schedule for Park Plaza Development

Park Plaza is scheduled to be developed in stages starting with the Park Square parcel and then extending to the Statler Hilton Parcel and to the Eliot Street Garage Parcel. Each stage would be separated by about three years, so that acquisition of major parcels would occur, as now scheduled, in 1975-76, 1978 and 1981-82. Initial occupancy is scheduled to occur in 1981 with subsequent major occupancy milestones occuring in 1985 and 1987.

The proposed Park Plaza parking facility is centered around a major rehabilitation of the existing Motor Mart Garage, but is also scheduled to be developed in stages since major parking expansion would be involved for each of the larger alternatives. The staged opening of the parking facility is shown in Table III-1.

The proposed staged development has two major implications for the transportation analysis. The most important is that the 1975 existing conditions described in the previous section must be forecast to one or more future years so that the impact of projected Park Plaza trips occurring in those years can be estimated. As an approximation, 1985 has been selected as the single base year, and remaining sections of this section discuss the factors necessary to forecast 1985 base transportation conditions; specifically:

- Historical trends in modal utilization
- Committed transportation improvements
- Population and employment projections
- Other planned office and retail developments
- Existing trips to be displaced by Park Plaza
- Existing travel patterns of project Park Plaza population

Specific conclustions for each of these factors are summarized at the end, after each topic has been separately discussed.

The second implication of the development schedule is that the staged opening of Park Plaza to tenants will itself act to mitigate potentially adverse transportation impacts in comparison to opening of the development for total occupancy at a single point in time. People's transportation behavior has been shown to be quite adaptable; individuals change their choice of travel time, mode, and routing as the level of service changes. Similarly, the transportation system itself changes, making accommodations through new traffic signal timings or changes in train service frequencies in order to handle a higher demand. When these changes occur in relatively small increments Penn Central systems respectively (Table III-4). Between 1972 and 1973, B & M ridership actually declined 6.4%.

TABLE III-1

Time Schedule of Park Plaza Parking Availability

Time	Alternative				
	2M	3M	4M	5M	6M
1978	930	930	930	1200	1482
1979					
1980					
1981					
1982	465	465	645		
1983					
1984					
1985				860	1649
Total Spaces	1395	1395	1575	2060	3131

and are staged over a period of 6-10 years, the effect is to significantly diminish the effect of what would appear to be a potentially large number of new trips were they all to be added to the system at a single point in time.

B. Historical Trends in Modal Utilization

One means of forecasting 1985 modal usage is simply to examine recent changes in travel and to extend these trends to the desired future year based on either a linear or a more elaborate extrapolation scheme. The examination of historical trends can also serve as a check on the realism of any separate modal forecasts that may be available. However, because of possible changes in transportation policy or the rate of new construction, care should be taken not to rely exclusively on historical traffic trends.

Changes in automobile traffic levels over time have been determined by examining cordon counts published by the city of Boston Traffic and Parking Department. Figure III-1 illustrates changes in daily and peak hour counts from 1954 through 1974. As can be seen, both the A.M. and P.M. peak counts remained stable between 1964 and 1972, but increased from 1972 to 1974. For example the P.M. peak hour vehicle flows leaving the cordon area were as follows:

	Vehicles	% Increase
1964	20,000	
1972	20,100	.5%
1974	22,100	10%

These numbers include both expressways and arterials. Examination of arterials, however, yields a different set of figures, as shown in Figures III-2 and III-3, and tabulated below:

	4-6 P.M.			% Change	
	1954	1972	1974	54-72	72-74
Commonwealth Ave.	2209	1694	1784	-23%	5%
Columbus Ave.	1698	1604	1687	-5.5%	5%

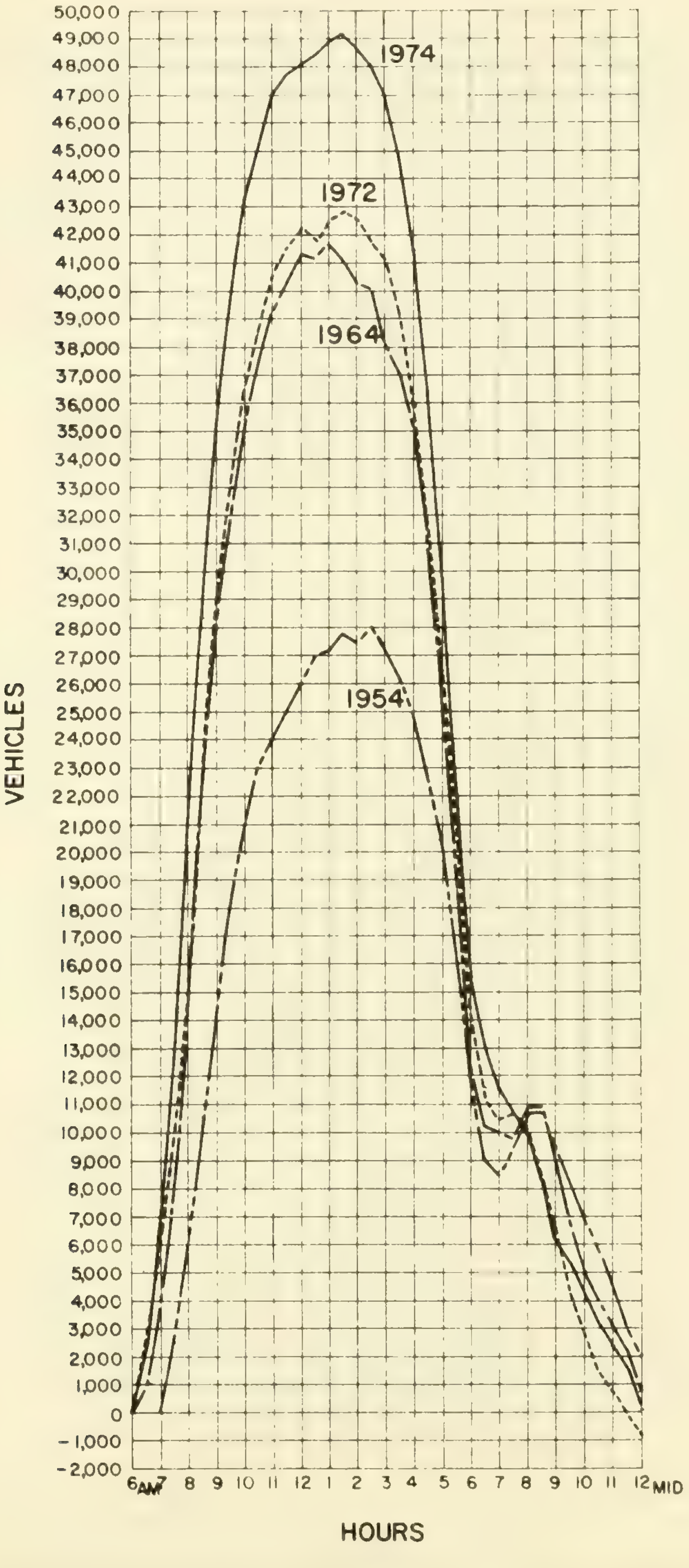
Traffic on Commonwealth Ave. decreased 23% between 1954 and 1972 with the opening of the Massachusetts Turnpike extension. Between 1972 and 1974, traffic has increased, but less rapidly than the total cordon count. The Columbus Ave. figures are similar but not as dramatic since the southwest corridor is not directly served by an expressway. These numbers seem to indicate that recent traffic growth can be explained and characterized by an increasing reliance on the use of expressways for major access. It should be noted, however, that these counts are taken at the downtown cordon line and undoubtedly differ in their trends

FIGURE III-1

COMPARISION 1954,1964,1972, & 1974

ACCUMULATION OF VEHICLES ENTERING & LEAVING STUDY AREA

6:00AM TO 12:00MID

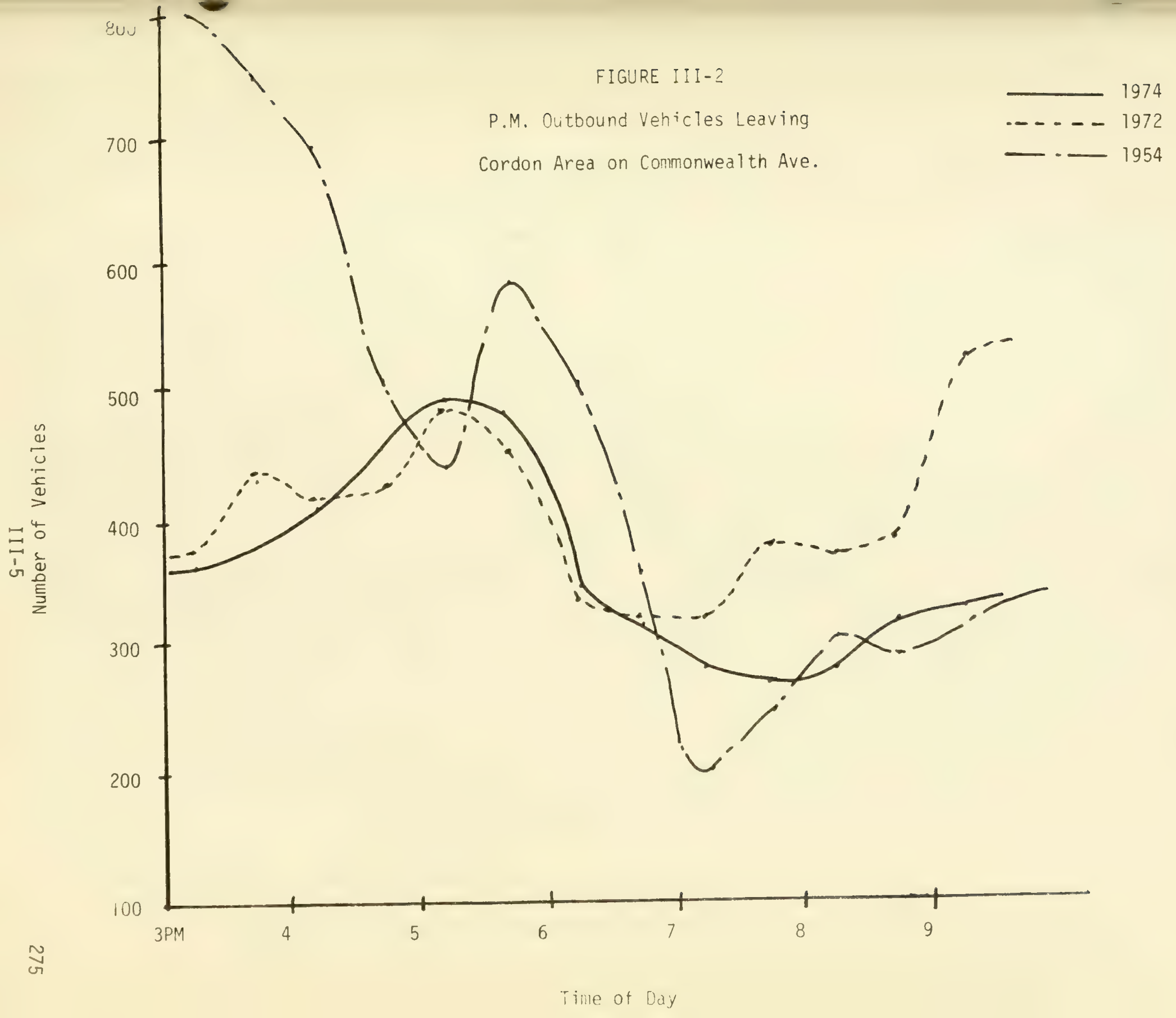


Source: Cordon Count, Downtown Boston, 1974, Boston Traffic and Parking Department

FIGURE III-2

P.M. Outbound Vehicles Leaving

Cordon Area on Commonwealth Ave.



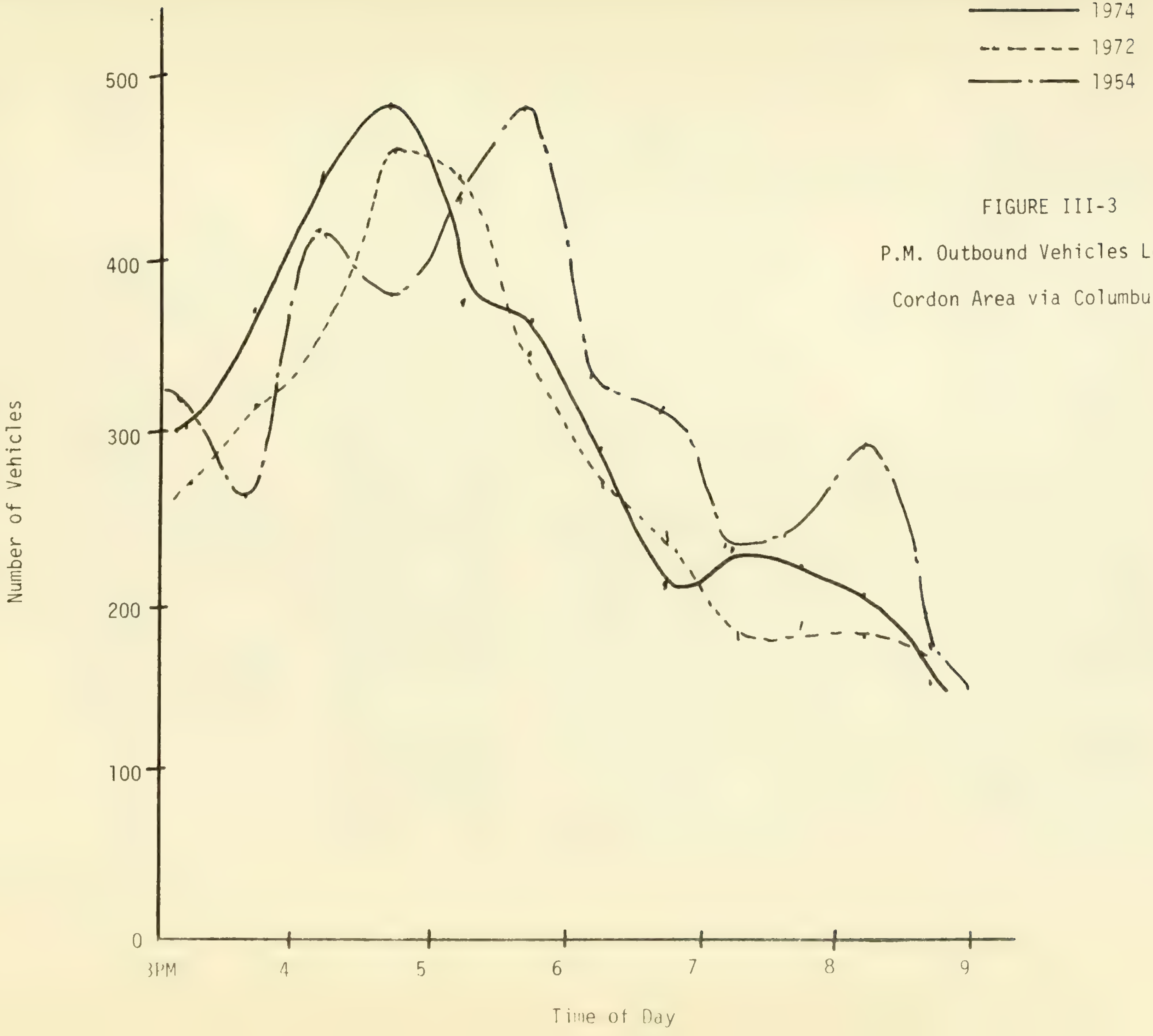


FIGURE III-3

P.M. Outbound Vehicles Leaving Cordon Area via Columbus Ave.

from those of local arterials and streets in the immediate Park Plaza area. Streets within the core area serve as collectors and distributors for all C.B.D. oriented vehicles, regardless of their means of access. Their rate of change in traffic flow can be expected to be somewhere within the range defined by the total cordon count and the major access arterials.

The vehicle cordon count data also can be examined to get an idea of changes in peak parking demand. The following represent changes over time of maximum vehicle accumulation (Figure III-1).

	Vehicles	% Change	
1964	41,600		
1972	42,900	3%	
1974	49,100	14% ('72-'74)	18% ('64-'74)

These numbers again show a relatively stable condition between 1964 and 1972, with a rapid increase between 1972 and 1974.

Changes in transit ridership can be determined by examination of both the downtown cordon line counts and the published M.B.T.A. station boardings. Table III-2 summarizes selected cordon count information. All forms of rapid transit have suffered from a decreasing utilization. The larger peak losses result in part from changes in travel patterns. For example, the 4:00-5:00 streetcar count of persons leaving the study area increased 23% between 1972 and 1974 while the 5:00-6:00 decreased 35%.

These same trends are confirmed by the station boarding counts. Daily station boardings declined from 441,900 in 1964 to 378,955 in 1974, a decrease of 14%. Table III-3 illustrates station boardings over time for selected rail transit stations in the vicinity of Park Plaza. Copley and Boylston on the Green line have experienced growth while only Charles St. on the Red and Orange lines have grown. A pattern of stable to decreasing ridership was predicted in 1969 by the Central Area Systems Study. The following numbers represent 24 hour, weekday directional volumes between Arlington and Boylston stations, as forecasted by this study:

	Inbound	Outbound
1964 calibration	50,716	53,013
1975 low	49,938	52,728
1975 high	55,122	57,912

Commuter rail systems serving the Boston area have experienced a similar decline in ridership, showing estimated annual losses between 1966 and 1973 of approximately 3% and 1% on the Boston and Maine and

TABLE III-2

P.M. Peak Public Transportation Ridership Counts

System	4:30 - 6:00 P.M.			% Change	
	1964	1972	1974	64-72	72-74
Streetcars	14829	14117	10849	-5%	-23%
Rapid Transit	67507	59039	50906	-13%	-14%
Buses	7224	8306	8727	15%	5%

System	Total Daily			% Change	
	1964	1972	1974	64-72	72-74
Streetcars	52279	50832	43157	-3%	-15%
Rapid Transit	166906	158761	144316	-5%	-10%
Buses	32667	24647	26870	-25%	+10%

TABLE III-3

2 Way Station Volumes Near Park Plaza 24 Hr.

DATE *	STATION							
	Green					Orange		
				Red				
	Copley	Arlington	Boylston	Park	Charles	Wash.	Essex	State
1964	11600	15200	6800	28700	3450	45900	9200	16100
1970	10490	17493	6411	30218	6153	45032	6265	14220
1971	9189	16415	7816	30495	6229	47520	6262	14002
1972	11191	16559	6117	25107	6348	40500	6429	15644
1973	11552	14513	5425	26039	6390	38057	6452	14197
1974	11382	11403	7541	24161	6851	37332	5834	12902
5 Yr. % Change (70-74)	+ 9%	-3%	+18%	-20%	+11%	-17%	-7%	-9%

* December 4, 5, or 6

C. Committed Transportation Improvements*

A number of major improvements to the transportation system serving the Park Square area are scheduled for implementation before 1985, and are described in the following paragraphs. As these new or improved facilities will be in place prior to Park Plaza occupancy, they will serve to change, rather significantly in some cases, the capacity and characteristics of the transportation system available to serve Park Plaza. The analyses and findings described in Chapter V assume the described improvements will be implemented and operational. In several cases, such as the local street system, still further improvements are possible; these are discussed separately later as mitigating measures.

Some of the changes are being planned independently of Park Plaza, while others such as new Charles Street will be developed in conjunction with Park Plaza. Both types of changes are described below.

Streets

Inherent in the Park Plaza plan is removal of Park Square, removal of Columbus Avenue between Arlington Street and the Square, construction of new Charles Street, and improvements to Stuart/Eliot Streets.

New Charles Street: Charles Street will be continued between Stuart and Boylston with a 52' right-of-way. The street will be one-way northbound with 4 lanes and 1 loading lane.

Stuart Street: Stuart Street will be widened to provide 6 moving lanes from the site to east of Washington Street. This will increase capacity considerably to both the Southeast Expressway and I-93 from Park Plaza. Current problems contributing to congestion will be eliminated such as narrowness, poor alignment, and lack of lane demarcation.

Tremont Street Widening: On the north side of Boylston, a widening of Tremont Street to accommodate right-turns onto Boylston is being considered. As part of the Park Plaza Project, a widening is planned between Allen's Alley (south of Boylston) and Stuart Street.

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*Information presented in this section is based on material furnished by the Boston Redevelopment Authority and also on conversations with officials of the M.B.T.A. and the Executive Office of Transporation and Construction.

TABLE III-4

Commuter Rail Annual Passengers

	1966	1973	% Change
Boston and Maine	6,390,263	5,062,346	-21%
Penn Central	2,215,321	2,103,300*	- 5%

* Estimate, last count was 1971, 1,979,919

Source: Massachusetts Bay Transportation Authority

Several other possible street improvements could affect Park Plaza related travel. These include the following:

New Essex Street: Creation of new 3-lane westbound street on Essex Street, Rowe Place, Exeter Place and Avery Street between Atlantic Avenue and Washington Street; thereby improving east-west circulation through downtown and possibly taking traffic off Stuart-Kneeland Streets.

Tremont Street/Columbus Avenue: As part of the South End Urban Renewal Plan, Tremont Street and Columbus Avenue are currently being redesigned. Columbus Avenue will provide a 44' roadway, with two moving lanes and two parking lanes. Parking will be prohibited in the peak direction in peak hour, to provide three moving lanes. Tremont Street will provide a 44' roadway plus two 8' parking lanes to be defined by neckdowns. The redesign is intended to accommodate existing volumes; however, Columbus Avenue will be turned into Tremont at Sarsfield Street, thus encouraging use of Tremont for through-traffic, and thereby affecting approaches to Park Plaza.

Massachusetts Turnpike Ramps: Land in the vicinity of Atlantic Avenue and South Street formerly used for rail service is being considered for additional Turnpike ramps. A new northbound ramp would be constructed to feed traffic to Atlantic Avenue with the South Street ramps becoming one-way southbound. A direct connection would be provided to the new South Station Garage. The most immediate impact of this change would be to lessen the current confusion at the intersection of Kneeland Street and the Central Artery; the project also would have a major effect on Stuart-Kneeland traffic and on the Park Plaza area by providing easier east-west access to the Turnpike.

An additional change to the local street system which could affect Park Plaza is the proposal currently under consideration to narrow Boylston St. between Arlington and Charles Streets. Presently there are six lanes of moving traffic and two lanes of parking. Two specific proposals are being considered: 1) return some of the northern lanes to the Public Garden, and 2) reclaim some of the southern lanes for pedestrian frontage to Park Plaza. Assuming that the new Park Plaza parking garage entrances will be located on Stuart Street, little new traffic is expected to use the Boylston frontage, especially since new Charles Street will flow one-way away from the site. Our analysis indicates excess capacity on this part of Boylston Street, even with projected Park Plaza trips. At least two and possibly three lanes of Boylston St. could be returned to non-traffic use without creating serious adverse effects.

RAPID TRANSIT

M.B.T.A. Green Line: A major improvement program is presently underway to upgrade service and capacity in the Green Line central subway system. This long-term upgrading program is designed to eliminate the specific problems discussed in the 1975 base regarding:

- insufficient number of vehicles;
- poor vehicle reliability;
- long station dwell times due to insufficient number of vehicle doors;
- unreliable scheduling of vehicles due to "bunching", interference with local street traffic, poor track signalization, and junction operation.

The first of the improvements is scheduled for late Fall, 1975. 175 new light-rail transit vehicles will replace most of the existing PCC cars, and additional power substations will provide electricity to handle increased acceleration, speed and air-conditioning. The car improvement is expected to increase one-way capacities to 16,000 passengers per hour at 68 second headways in the central subway. In contrast, current one-way peak hour volumes at Arlington Street are in the range of 8100 passengers, and the six million sq.ft. Park Plaza alternative is expected to increase ridership on the eastbound portion by 1800 passengers in the P.M. peak.

Each of the new vehicles has a maximum passenger load of 220 compared to 142 on the present PCC cars. The articulated cars are 70 feet long, 50% longer than the current cars, and 8 feet wide. Also, the new cars will have three doors on each side, while the PCC's have two doors on the right and one on the left. Each car will be equipped with two-way radio to improve dispatching.

M.B.T.A. Orange Line: The Orange Line is being relocated from its present alignment along Washington Street to the mainline Penn Central tracks in the southwest corridor. While the final design is not yet complete, the South Cove tunnel portion and station is already partially constructed. Thus, Park Plaza will be served by both the new South Cove and Back Bay stations in addition to the existing Essex Street Station. Construction for the entire relocation is scheduled to be completed by 1985. It is generally agreed by transportation professionals that the new Orange Line will attract riders from the Green Line, accommodating both line haul and downtown distribution needs.

Commuter Rail

A major Commuter Rail Improvement Program (CRIP) of approximately $75 million is planned for the 1977-1980 period which would improve capacity

and operations of Penn Central trains serving the Park Plaza area via Back Bay Station. The initial program includes acquisition of new cars, modernization of existing cars, new roadbed, and station improvements. A second phase includes electrification in order to achieve compatibility with the future inter-city rail system.

Commuter and Inter-City Bus

The Continental Trailways bus terminal now located in Park Square will be relocated to the new South Station Transportation Terminal, thereby eliminating the existing congestion of intercity and suburban express buses. Presently buses park illegally around Park Square, Eliot Street, and Charles Street. Many of the 91 scheduled buses use Columbus Avenue for access to the Massachusetts Turnpike or use Stuart-Kneeland Streets for access to the Central Artery. The current pedestrian movements and vehicle flows in the Park Square area associated with these arrivals and departures would be eliminated.

Parking Garages

Two new parking facilities could attract some Park Plaza bound trips. The 1500-car South Station garage, estimated to be completed in 1980, could serve some daytime parkers because of its convenience to the expressway. The 2000-car garage being developed as part of the LaFayette Place is not expected to serve Park Plaza during the day time but could compete for entertainment-related parking during the evening.

Pedestrian Movement

Plans for new and improved pedestrian circulation are described in the January 9, 1975 memorandum from Stewart Forbes, B.R.A., to the Park Plaza Civic Advisory Committee. While the specific details of pedestrian movement must await final design, the intent is to provide improved at-grade, north/south connections through the site area. Under consideration are 1) a pedestrian route aligned with Church Street connecting Bay Village and the Public Garden,and 2) a pedestrian route aligned with Warrenton Street connecting the legitimate theaters with Boylston Street and the Boston Common Parking Garage. These new north-south facilities are in addition to committed pedestrian connections along new Charles Street, improved east-west pedestrian movement along both Boylston and Stuart Streets, and a possible graded pedestrian crossing over new Charles Street.

D. Population and Employment Trends

In estimating 1985 base year conditions, it is important to look at recent and projected changes in both the resident population and the employment contained in downtown Boston. Future traffic conditions,

especially during the peak commuting hours, can be expected to be directly related to these two variables. A large increase in downtown employment, especially of middle to upper income service jobs, might be expected to result in a growth of automobile traffic. This growth, however, could be offset somewhat by a parallel growth in downtown population.

Information presented in this section is based on data prepared by the Boston Redevelopment Authority. Their sources were the 1970 U.S. Census, the 1974 Wilbur Smith Associates "Parking Strategy for Boston", and work by their own Research Department.

While the Boston Transportation Planning Review identified the portion of Boston between Routes 128 and 495 as constituting the area of highest population and employment growth, they also concluded that the core of Boston was likely to retain its population and to experience some slight growth in jobs. With public assistance, increased growth in the core city could be expected.

The information presented in Table III-5 is consistent with this general projection. Based on these figures, the B.R.A. estimates a 1970 to 1985 growth of 93,720 or 23% in the accumulated daily population of downtown Boston and of 74,664 or 21% in the total trips in the downtown area. The lower rate of increase in trips relative to employment growth reflects the large increase in downtown residents. The B.R.A. estimates based on current surveys that 63% of these residents will be employed, and that 50% of those employed will work downtown.

The specific new developments on which the floor space projections in Table III-5 are based are listed in Table III-6. These are major projects either planned or underway and scheduled to be completed by 1985. Of those identified, the 2,000,000 sq. ft. Hancock office tower is the most proximate to Park Plaza, being located in the block bounded by Clarendon St., Stuart St., Trinity Place, and St. James Ave. just off Copley Square. While the projected Hancock employment and trips are included in the figures of Table III-5, it is likely that many of the autos visiting Hancock, at least in part, will use the same routings as will Park Plaza bound traffic. The normal inbound peak hour automobile volume to the Hancock Tower is anticipated to be 1000 vehicles.* Also, the Hancock Tower and Park Plaza are located on the Green line so this transit facility will be affected by both developments.

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* Barton-Aschman Associates, May 1969.

TABLE III-5

Downtown Boston Population and Employment Trends

	Year				% Change		
	1960	1970	1975	Estimated 1985	60-70	70-75	70-85 75-85
Population	33,779	36,738		55,794	9%		52%
Employment		242,000	272,000	329,000		12%	36% 21%

Floor Space

	Year		% Change
	1975	1985	
Office (sq. ft.)	28,500,000	38,000,000	33%
Retail (sq. ft.)	5,900,000	7,300,000	28%
Hotel (units)	7,151	10,151	56%

Source: Boston Redevelopment Authority

TABLE III-6

Inventory of New Development

(Underway or Planned to be completed by 1985)

roject	Gross Additional Office (sq.ft.)	Retail (sq.ft.)	Hotel (units)	Housing (units)	
CBD, West End, Waterfront					
Blue Cross/Blue Shield	1,100,000	5,000			
Federal Reserve Bank	950,000				
National Shawmut	1,150,000	10,000			
State Office Bld. II	650,000				
Quincy Markets	175,000	200,000			
60 State Street	750,000	5,000			
175 Federal Street	150,000				
Charlestown Savings Bank	130,000				
1 Winthrop Square		18,000			
Lafayette Place	1,200,000	610,000	750		
Chauncy House				87	
Old South Square	130,000	26,000		400	
Stanford Blg.	200,000	11,000			
Amy. Lowell-Eld.				150	
Charles River Park D				710	
lackstone-Eld.				280	
ther-Waterfront				800	(approx. includin C-2, Sargent Wharf
SUBTOTAL	6,585,000	885,000	750	2,427	other proposed)
Back Bay, Beacon Hill, South Cove					
Sheraton			430		
Hancock Tower	2,000,000				
545 Boylston	91,000				
Vendome Conversion				120	
Holiday Inn-Dalton			430		
Statler	(200,000)		700		
Boylston -Exeter		12,000		160	
Bowdoin				30	
CSCDC (P4-A)				65	
South Cove-					
R-7, R-4				380	
R-1 Nursing				120	
Chinese Ch. Life Ct.				120	
SUBTOTAL	1,891,000	12,000	1,560	875	
otal Underway or Planned	8,476,000	897,000	2,310	3,302	
Additional Projected, (Park Plaza or other)	1,024,000	523,000	1,690	2,698	
TOTAL	9,500,000	1,400,000	4,000	6,000	

Source: Boston Redevelopment Authority

E. Existing Trips to Be Dislocated By Park Plaza

The Park Plaza site area presently contains both retail and office space, in addition to the parking facilities and bus terminal. These activities presently generate trips, some or all of which will be displaced by Park Plaza. These activities may relocate to other areas of Boston, move into Park Plaza, or cease altogether. In any case, the associated trips represent travel that exists now but which will not exist after Park Plaza is constructed. As such, these trips should be subtracted from either the 1985 base conditions or the projected Park Plaza trips.

Table III-7 shows existing, displaced, and new employment and floor space figures for two activity types: retail and office. The figures indicate that for the 3 million alternative, 43% of the existing retail floor space will be displaced and that the displaced floor space represents 46% of the planned new retail floor space. The corresponding figures for office employees are 60% and 17%. Assuming an equivalent trip making propensity (which may be more valid for office employees than for retail given the current mix of retail activities), these figures imply that the projected Park Plaza retail and office employee trips might be reduced by as much as 46% and 17% respectively in order to determine the transportation impacts. For the six million figure, the similar figures are 61% and 8%.

It is not proposed that figures of this high a magnitude by used in the analysis since the trip generation rates of the existing activities are both lower and of a different time distribution than those projected for Park Plaza. However, for A.M. and P.M. peak hour trip making which is largely employee oriented, a figure in the 10% range may be reasonable depending on the specific alternative being examined.

F. Existing Travel Patterns of Projected Park Plaza Population

The population of Park Plaza can be characterized as being either new to Boston or relocated from a site already in Boston. Those persons being relocated to Park Plaza are already using the regions transportation system. Accordingly, they do not represent entirely new trips, although they clearly may be new trips to the streets, rapid transit lines, and stations serving Park Plaza.

A source of information on this issue is a B.R.A. Research Department report, "Prudential Center, Part I: Its Direct Impact on Boston." The purpose of the study was to classify firms according to whether or not they increased employment in the city of Boston. Those increasing employment were newly created firms, new branches or chains, or firms new to Boston. The remainder were firms moving from previous locations in Boston. Table III-8 presents the results of this survey, indicating

TABLE III-7

Existing Trips To Be Displaced By Park Plaza

	Existing	Displaced					New				
		6M	5M	4M	3M	2M	6M	5M	4M	3M	2M
Retail											
Sq. Ft.	216400	216400	183231	153225	92353	-	351965	320765	251415	199050	48174
Employees	898	656	614	309	107	-	1477	1350	1058	836	198
Office											
Sq. Ft.	649260	649260	638204	449733	277021	-	1826969	1930185	1346591	530635	347338
Employees	618	618	618	381	370	-	7367	7758	4423	2229	1424

TABLE III-8

Prudential Center Effect on Employment

	No. of Firms	People Employed
Firms which increased Employment	54 (50%)	4106 (55%)
• Newly created firms	32 (29%)	131 (2%)
• New Branches of Chains	16 (15%)	3877 (52%)
• Firms new to Boston	6 (6%)	98 (1%)
Firms having no net Employment Effect	55 (50%)	3387 (45%)

Source: Boston Redevelopment Authority. "Prudential Center, Part I: Its Direct Impact on Boston."

that only 55% of the retail and office employment was new. The remaining 45% really reflect changes in current trips from their old site to the Prudential Center. As indicated above, a certain number of these already would be using the local streets and M.B.T.A., so that they really do not constitute new trips or a new demand for travel. Assuming similar patterns for Park Plaza, failure to take these trips into account could result in up to 45% overestimate of Park Plaza transportation impacts, depending on the exact previous location of the trip destination. A figure of 10% is felt to represent a conservative allowance for this particular kind of relocaton effect, and assumes most Park Plaza related trips will be new to the immediate area now constituting Park Square.

There also are second order effects that could be introduced. Those Boston firms moving to Park Plaza will vacate space which may be rented both by "new" firms and by existing firms, resulting in further, but indirect, transportation impacts. No allowance for such second order effects has been made as part of this study.

G. Treatment of 1985 Base Year Conditions

This section has discussed a number of factors necessary to project 1975 existing conditions to 1985 base year conditions. While a wide variety of numbers have been presented in order to communicate an understanding of the kinds of changes that may occur over the next ten years, the following conclusions are of primary importance.

- Several major improvements to the capacity and operation of both the street and transit systems serving Park Plaza will be implemented prior to occupancy. The most significant of these are the M.B.T.A. Green Line where scheduled capacity will be approximately doubled and the local street circulation system in the immediate vicinity of Park Plaza where existing causes of congestion will be eliminated.

- Downtown employment may increase in the range of 15-20%.

- This employment increase, combined with the scheduled improvements to the rapid transit and commuter rail systems and the downtown parking policy, may be sufficient to stabilize and possibly even reverse the current downward ridership trends on the M.B.T.A.

- Automobile traffic on the local streets in the Park Plaza area is likely to continue to grow, though probably at a lower rate than in the 1972-74 period. A figure of 15% over the ten year period is felt to constitute a reasonable estimate.

- Park Plaza will displace some existing trips on all modes of travel, approximately 10% of the projected new trips.

- Up to 45% of the activities to be associated with Park Plaza will move from other areas within the Boston region. Consequently, some of these trips may not reflect new trips to the transportation system serving the immediate Park Plaza area. A reasonable allowance for this factor is felt to be 10% of projected new Park Plaza trips.

PRIVATE UTILITIES

A description of the present and projected conditions, including system demand and capacity, for electrical, steam, gas, and telephone service is described below.

. Electric (existing) - B38

The current downtown Boston business area load of approximately 700,000 KVA is supplied from existing bulk power facilities. This capacity which includes the new Belvidere Street 115 KV bulk substation (completed in 1973) is capable of supplying up to 1,000,000 KVA of load to the downtown area.

The present peak hour demand for the project area is 6,000 KW with present peak hour capacity of 10,000 KW.

Projected:

Future requirements of the downtown business area of Boston could reach 1½ million KVA by 1985. To supply this capacity requirement, a new 115 KV bulk sub-station is planned for the Kingston Street area. The first phase of the Kingston Street Station construction is scheduled for the summer of 1975 with successive additions planned in future years as the load grows. Transmission capacities require that a 345,000 volt system, augmenting the 115,000 volt system, be installed in conjunction with one of the future Kingston Street Station expansion steps. Specific lower voltage feeders and utilization voltage transformers will be required to meet the several loads of the Park Plaza Project.

It is anticipated that by 1985, Boston Edison will have 100,000 KW of peak hour capacity for the project area.

. Steam - B44

The present demand for steam in the project area is 40,000 pounds per hour (3,000 for Parcels 1 and 2; 3,000 for Parcels 7 and 8; 5,000 for Parcels 9 and 11; and 11,000 for the Little, Walker and Colonial Buildings - areas which will or could be retained according to the various development alternatives).* Existing capacity for this area is 100,000 pounds per hour.

Future improvements include the operation of a new boiler at the Kneeland Street plant by December, 1975. This boiler will be able to deliver 382,000 pounds per hour and will serve the Government Center area. The three old boilers plus an auxiliary line from the "L" Street plant in South Boston will then be utilized to serve the rest of downtown Boston and part of the Back Bay, having a capacity of 700,000 pounds per hour.

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* For a definition of parcels refer to the Development Program Interpretation.

With the project area directly along the major distribution Corridor to Back Bay, the availability of large quantities of steam is assured. The estimated capacity available for the project area by 1985 is 180,000 pounds per hour (provided that new mains are installed within the area).

. Gas - B44

The present demand for gas in the project area is 7,500 cubic feet/hour. Since Boston Gas is no longer seeking new customers and if a customer discontinues his service, present policy is not to transfer that service to the new customer occupying that site, it is assumed, therefore, that future - 1985 - capacity is zero cubic feet per hour. (A possible exception to this situation would be where a customer is willing to pay for any new mains and installation costs and if the type of service is not seasonal). Furthermore, it is possible that the supply situation may improve in the future in which case new demand for gas could be accommodated.

Boston Gas has indicated that it does not consider gas to be competitive with Edison steam or electric as a source of energy for heating or air-conditioning.

. Telephone - B46

Within the project area today (including the Statler Hotel and Office Building) there are 8,000 pairs or stations. New England Telephone's ability to supply any more lines to this area (without additional capacity) is limited to 400 stations, making the present capacity 8,400 stations.

By 1985 projected capacity is 13,500 stations. This will be accomplished by installing new conduits in the area. Further while the area is now served partly by the Back Bay Exchange, in the future the entire area will be served by the Harrison Avenue Exchange.

UTILITIES - PUBLIC

The following sections present the projected condition of the utilities servicing the proposed Park Plaza Development area for the year 1985.

Water - B40

The MDC has a continuing program for upgrading and maintaining the various systems under its control. As a department within the MDC the Water Division, in coordination with other agencies, has established programs to meet future demands of member communities.

The 1985 projected water consumption of the member communities of the water system is approximately 441 million gallons per day. In reviewing the forecast demands, the MDC has established specific development programs.

Water Supply System Activities

Two major projects are being considered by the MDC to increase the current (1975) 300 MGD dependable safe yield of the water sources. Current legislation has approved a diversion of water from the Connecticut River Watershed for immediate supply and use for the MDC system. The planned completion date for the project is prior to 1984. The yield from this project is estimated at 72 MGD, bringing the MDC supply source to 372 MGD.

In addition to the Northfield Mountain Project, the potential of diverting water from the Millers River Basin, a tributary of the Connecticut River, is being investigated. Depending on the method of development employed, this source could yield additional supplies of 48 MGD to 76 MGD.

Development of both the Northfield Mountain Project and the Miller River Basin Project would increase the supply capacity from the present (1975) 300 MGD to 372 MGD in 1984 and up to 448 MGD by 1990.

Also, the MDC has underway a large scale investigation of the adequacy of the system's aquaducts. Improvements to the MDC water conveyance systems are anticipated to continue with the increase in demands for its services. Certain improvements are expected to maintain and in some cases increase the level of pressures supplied to the City of Boston. The program, which began in 1973, is a twenty million dollar 10 year program.

An example of the MDC efforts is the recent construction of the 10 foot diameter Dorchester Tunnel. The addition of the new tunnel has noticeably improved the pressures by approximately 10 psi in the Dorchester southern high service distribution network since it was made operational in January, 1975.

Although the mains serviced by the Dorchester Tunnel do not directly service the Park Plaza area, improvements in the water supply network are transferred by loops to the area. A Boston water distribution report in 1967 stated that there is a high degree of interaction between the MDC and the City of Boston Distributing Systems. Major changes in either system result in corresponding effects on the other.

High Pressure Fire System - B42

Some modifications the the HPFS are anticipated by 1985. At present, the Public Facilities Department of the City of Boston has completed architectural design for the construction of a new fire station to be located above the Dewey Square tunnel of the expressway. A new high pressure pumping station, equipped with independent diesel powered pumps, is proposed to be located in the basement of this new fire station. It is anticipated that this will replace both of the present stations, as described in the 1975 base conditions.

Sewer Systems - B50

Similar to the Water Division efforts, the Sewer Division has a continuing program for new development and maintenance of sewer systems. The major project affecting the Park Plaza area is the Charles River Marginal Conduit Project (CRMC). The project completion date is set for the spring of 1978. This date coincides with the projected completion date of the new Charles River Dam presently under construction.

The CRMC project is necessitated by the construction of the new Charles River Dam. The construction will convert the estuary between the old dam and the new dam to a fresh water basin. Presently the combined sewer overflows from the Boston and Cambridge Marginal Conduits are discharged below the old dam. The project as conceived will prevent a polluted condition in the new basin and will also abate pollution in the Charles River Basin above the old dam and in the estuary below the dam. (For a more complete description of this project and the benefits projected refer to the technical Appendix).

The Marginal Conduits will be extended below the existing dam to convey flows to the proposed chlorination-detention-pumping station on the north side of the Charles River. The pumping station is being designed to handle flows equal to the estimated runoff of a once in five year storm. Treatment will consist of screening, settling and chlorination. The facilities will remove suspended solids, floating solids and will reduce populations of microorganisms.

The project should eliminate the tidewater intrusion into the Boston and the Cambridge Marginal Conduits. Elimination of tidal effects will increase the usable capacity of the conduits and prevent combined sewer overflows into the Charles River Basin during dry weather conditions. The overflows during wet weather conditions will be reduced to about a once in five year period.

. 1985 Wastewater Treatment Facilities

Presently there is an ongoing wastewater management study for Boston Harbor - Eastern Massachusetts Metropolitan Area (EMMA). In January of 1975, recommendations concerning treatment systems for the future watewater flows of 60 Metropolitan area communities were presented by the technical sub-committee on Boston Harbor which is overseeing the study. Agencies represented on the sub-committee are; the Metropolitan District Commission (chairman), the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the Commonwealth's Department of Public Health, Division of Water Pollution Control, and the Metropolitan Area Planning Council.

The present primary treatment plant at Deer Island would be upgraded to secondary treatment to handle anticipated average flows of 380 million gallons per day in the year 2000. This is compared to the 343 MGD capacity for 1975. Further the facility would provide for incineration of sludge thereby eliminating the discharge of sludge to the Harbor.

1985 BASE SOCIAL POLITICAL ENVIRONMENT PARAMETERS

The following social political environment parameters would be affected by the occupancy and use of the completed Park Plaza project:

SUB COMPONENT/PARAMETER		STATUS
Demographic Structure*:		
S01	Population size	Building Study Stage
S02	Population density	Defer to Development Phase
S03	Population distribution	Defer to Development Phase
S04	Age character	Defer to Development Phase
S05	Sex character	Defer to Development Phase
S06	Ethnic composition	Defer to Development Phase
S07	Marital status	Defer to Development Phase
S08	Occupational character	Defer to Development Phase
S09	Income character	Defer to Development Phase
S10	Education/health level	Defer to Development Phase
S11	Family structure	Defer to Development Phase
S12	Family size	Defer to Development Phase
Group Structure:		
S13	Institution type	Deleted
S14	Institution size	Deleted
S15	Institution character	Deleted
Political Structure:		
S16	Political district	Deferred to Operational Stage
S17	Political composition	Deferred to Operational Stage
Functional Services:		
S18	Educational system	Deferred to Operational Stage
S19	Educational capacity	Building Study Stage
S20	Health services system	Deferred to operational Stage
S21	Health services capacity	Building Study Stage
S22	Social services system	Deferred to Operational Stage
S23	Social services capacity	Building Study Stage
S24	Police protection system	Deferred to Operational Stage
S25	Police protection capacity	Building Study Stage
S26	Fire protection system	Deferred to Operational Stage
S27	Fire protection capacity	Building Study Stage
S28	Emergency System	Deferred to Operational Stage
S29	Emergency capacity	Building Study Stage
S30	Parks and recreation system	Deferred to Operational Stage
S31	Parks and recreation capacity	Building Study Stage
S32	Cultural services system	Deferred to Operational Stage

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* For this information, refer to Social Political General Base "Demographic Characteristics" Table

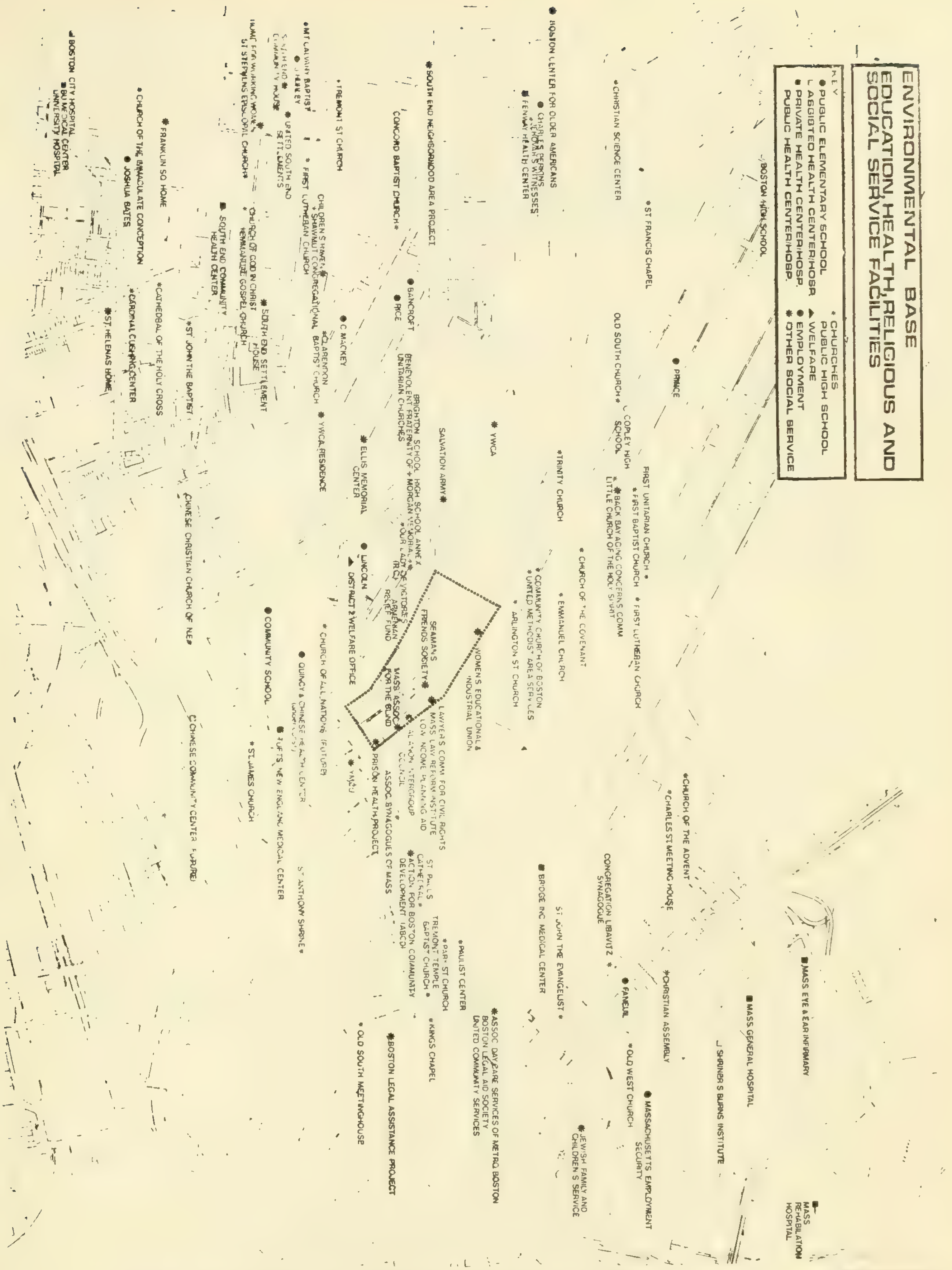
SUB COMPONENTS/PARAMETER		STATUS
S33	Cultural services capacity	Building Study Stage
S34	Solid waste management system	Deferred to Operational Stage
S35	Solid waste management capacity	Building Study Stage
S36	General govt service system	Deferred to Operational Stage
S37	General govt service capacity	Building Study Stage

Functional Services

The functional services available to residents, employees, and visitors in the downtown include:

- Education
- Health Services
- Social Services, including Elderly
- Police Protection
- Fire Protection
- Parks and Recreation
- Cultural Services
- Solid Waste Management

Contained in this section are descriptions of each of these service areas, including the kind of service delivered, capacity constraints, client volume or service demands, and any other problems or special features which are related.



PARK PLAZA BUILDING STUDY STAGE
ENVIRONMENTAL IMPACT ANALYSIS

PREPARED BY
BOSTON REDEVELOPMENT AUTHORITY
CITY HALL
THE SARATOGA ASSOCIATES
BRISTOL, LITYNSKI, WOJCIK, TARBOX, HOLLISTER, CINQUINO, AND MOORE PC
THE ARCADE
DATE 1975

BOSTON, MASSACHUSETTS

SARATOGA SPRINGS, NEW YORK

EDUCATIONAL SYSTEM & CAPACITY - S18, 19

With the Boston Public Schools currently under a court-ordered desegregation plan, an accurate definition of the impact area for education is impossible. However, under a traditional neighborhood schools approach the public schools which would be immediately affected by the project (see the Community Facilities map) are:

Elementary: Lincoln (South Cove)
Middle: Quincy (South Cove)
Mackey (no longer a neighborhood school)
Michelangelo (North End)

Two additional public elementary schools within the surrounding area are: Peter Faneuil (Beacon Hill) and Prince (Back Bay). Also the Brighton High School Annex presently based at the U. Mass. property at 100 Arlington Street was used during 1974-75 but is now closed. Within the entire downtown, during 1974-75 there were 28 elementary schools, five middle and five high schools. A recent survey indicates there are also more than 50 private schools in downtown Boston ranging from kindergartens (e.g., the Advent School, Beacon Hill) to secondary and advanced schools (e.g., Don Bosco High School and Tufts New England Dental School, South Cove.)

Existing Conditions (1975)

1974-75 enrollment and seating capacity at the three neighboring schools are:

School	Enrollment	Threshold/Capacity
Lincoln	508	700
New Quincy	under construction	800
Old Quincy	-	300

Project Conditions (1985) and Threshold

Anticipated enrollment based on School Committee projections for the three potentially affected schools in the impact area is:

School	Enrollment	Threshold/Capacity	Available/Surplus
Lincoln	520	700	180
New Quincy	500	800	300

HEALTH SERVICES SYSTEM AND CAPACITY - S20, 21

Impact Area

Within downtown Boston there are an unusually large number of public and private health facilities. In addition to the private physicians and medical practitioners, several prominent hospitals, including Tufts New England Medical Center and Massachusetts General Hospital, are within easy access of the project area. Other health clinic facilities readily accessible are Bridge, Inc. (for youths), Medical Center, Lindeman Mental Health Center, Boston City Hospital, the Chinese Health Center, now under construction, B.U. Medical Center, and the Fuller Mental Health Center. (Refer to Community Facilities map)

Existing and Projected Conditions

Among the special health care needs of any community, including downtown Boston, the City's Commissioner of Health and Hospitals has identified these shortages or inadequate coverage: dental care, individual health programs; and nursing home beds. Hospital emergency services and bed capacity for surgical, pediatric, and obstetrical purposes, appear to be adequate.

SOCIAL SERVICES SYSTEMS AND CAPACITY - S22, 23

Social services for the low income needy are primarily available through the Massachusetts Department of Public Welfare's District #2 Office on Church Street (which is presently under-utilized realtive to other DPW offices - current number of welfare recepients, 9,500). Also available for the eligible needy are the Ellis Memorial Center (private) on Berkeley Street just south of the Massachusetts Turnpike and two day care centers: Castle Square and 464 Tremont.

Elderly Affairs

The Mayor's Commission on Affairs of the Elderly is the citywide coordinator of services for all residents 60 or over. Among the neighborhood facilities which provide services are: the Boston Center for Older Americans (now defunct); Ellis Memorial Center; and District #2 Welfare Office (Refer to Community Facilities map).

The Elderly Affairs Commission is staffed with some 35 professional or administrative personnel. The commission oversees a variety of programs and services, many of which are federally funded:

Supplemental Security Income - Federally-administered national income floor for the needy, aged, blind, and disabled.

Home Care - Program which provides basic supportive service for the needy elderly which include: case work, homeworker - home health aid services, escort and emergency assistance, and transportation for medical and non-medical assistance. The program for Boston is administered through three area corporations (Area 3 headquarters which includes the project area is located on Huntington Avenue adjacent to the Boston Center for Older Americans). Funding is provided through the Title III HEW grant.

Nutrition Program - A hot meals, or meals-on-wheels, project which provides congregate and home delivered meals for the needy elderly. Congregate centers for Area II and Area III (which encompasses dontown Boston) are located in the First Lutheran Church, 229 Berkeley Street and the Old West Church, Cambridge Street.

Other Services and Programs

The Elderly Hotline
Mayor's Older Bostonian's Discount Program (MOB)
Taxi Discount Program
Consortium on Elder Opportunities (employment-related)
Bright Eyes - free glaucoma screening program
Visiting Aides, Senior Aides, RSVP-volunteer services, as well as numerous private charitable organizations.

The future funding levels for these services is unclear. The Nutrition Program, for example, may be forced to reduce its home-delivered meal service, which would encourage the expansion of the more efficient congregate meal center approach.

Services which are presently inadequate largely center around leisure-time activities such as recreational facilities, cultural events, and adult education classes.

Existing and Future Conditions

1. Size of the Elderly Population

The latest census data indicates Boston has 112,508 residents who are 60 or older, or 12 percent of the city's total population. One-fifth of these elderly citizens fall below the census-determined poverty level for income.

	City	Back Bay - Beacon Hill	Central
Total Pop. (1970)	641,000	26,228	9,400
Elderly Pop. "	81,718	3,207	1,325
% Total Pop. "	12.8%	12.0%	14.4%
% Total Pop.(1985)	12-14%	--	--
Income: Below Poverty Level	20,000 approx.	513	331
% of Elderly	20%	16%	25%

2. Housing Needs

In a June 1974 report entitled Housing for Boston, the BRA Research Department estimated that between 13,000 and 37,000 elderly households required some form of housing assistance. (The criteria producing this conclusion includes: excessive costs - over 30% of total income - for renters or homeowners; substandard or crowded units; and involuntary status as a dependent.) As part of the strategy to provide for these needy elderly, the study recommeded that 18,000 new dwelling units be constructed over the next ten years. New construction is a particularly appropriate strategy for two reasons: special amenities can be designed into a new facility; and the homes vacated, which are often moderately-priced and underutilized, become valuable additions to the housing market for larger families. With only 3,000 units now either occupied, underway, or planned, a major deficiency exists.

Analyzing the need for elderly housing from the criteria of available resources (550 units in 1974, BHA) and greatest need, the Boston Housing Authority has concluded that downtown Boston represents a low to moderate priority area within the City. With 5.2 percent of the City's elderly population with incomes below the poverty level, the downtown has 4.3 percent of the publicly-subsidized, low-rent elderly units (these units include: Amy Lowell - 150; Blackstone*- 176; St. Botolph Street -134; and Quincy Towers - 160) - a far healthier ratio than exists in many other neighborhoods. (In Allston-Brighton it is 10.1% to 4.1%) * Planned

Thresholds

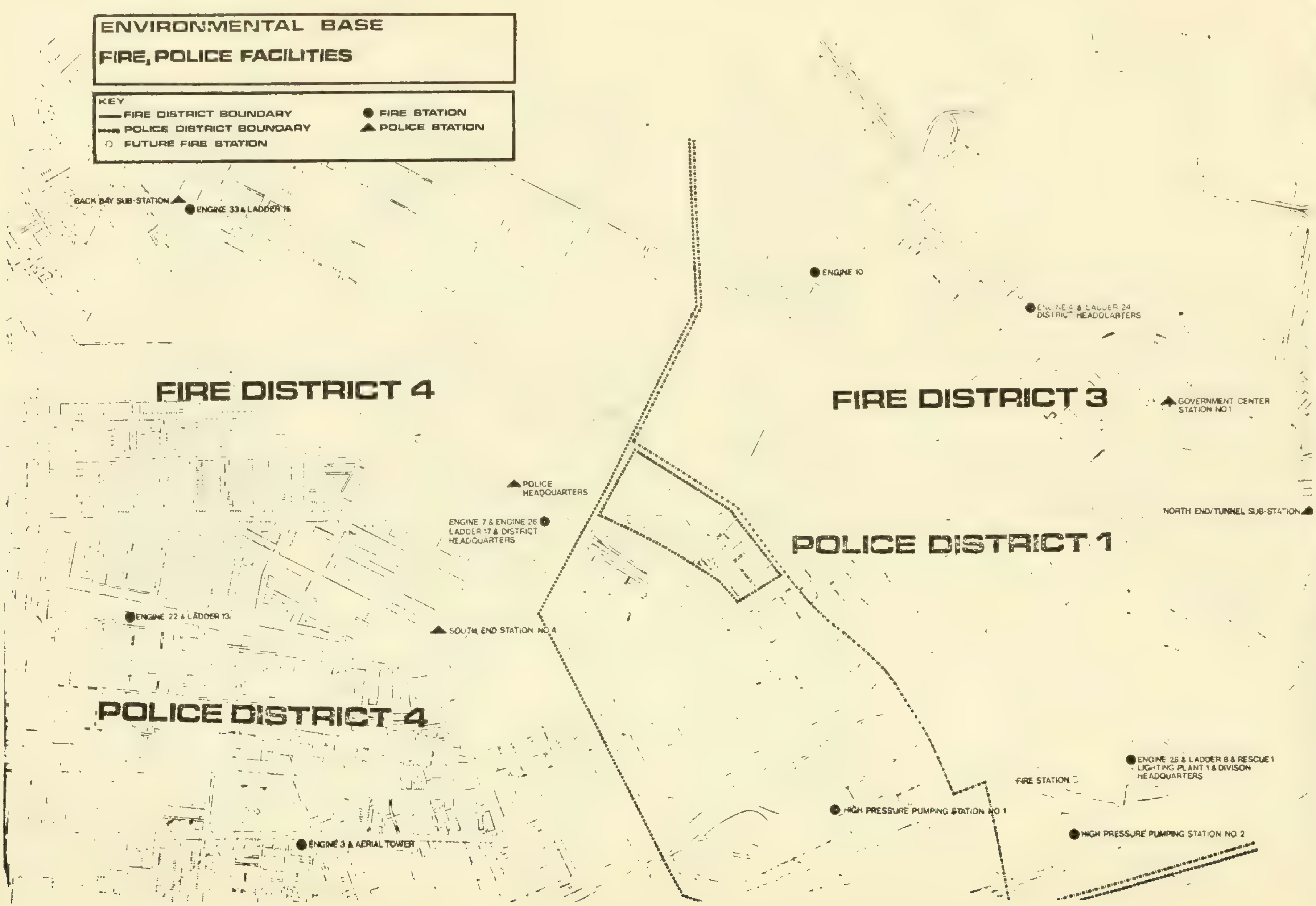
Some of the planning criteria for elderly housing site selection are:

- proximity to medical and health facilities
- proximity to retail centers
- proximity to cultural, governmental, and social service facilites
- proximity to recreational areas and open space
- absense of crime and crime-related conditions - inadequate street lighting, building abandonment, transient population, and bars and entertainment centers.

Specific requirements for new elderly housing, wherever the location, include:

- a recreational hall (6,000 sq.ft. for 200 units, a HUD standard)
- kitchen facilities within common areas
- a medical suite , a health clinic
- a congregate meal center
- handicapped facilities, etc., as per State Building Code

ENVIRONMENTAL BASE
FIRE, POLICE FACILITIES



PARK PLAZA BUILDING STUDY STAGE
ENVIRONMENTAL IMPACT ANALYSIS
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THE ARCADE
SARATOGA SPRINGS, NEW YORK
DATE 1975

FIRE PROTECTION SYSTEM AND CAPACITY - S26, 27

Fire protection service for downtown Boston is provided through District #3 and #4 (which includes the Park Plaza Urban Renewal Area) of the Fire Department. The boundaries of these districts and the location of fire stations and related facilities are shown on the Public Safety map.

Existing Conditions (1975)

Districts 3 and 4 both have 10 companies (either ladder or engine) with 22-24 men assigned to each, and at least four on duty at all times. According to Fire Department records the average number of responses per day in each of these districts is 10, with an average response time of one to two minutes. Approximately 11 per cent of the total responses represent building fires with actual losses.

Within the project area, despite the high number of code violations issued (25 during the first three months of 1975), there has been only one serious fire since 1970 (in 1970 at 8 Park Square - value of property loss, $15,000). In fact, only three per cent of the alarms responded to in this area during the first three months of 1975 resulted in building fires with a loss (5 of 175).

Projected Conditions (1985)

The large number of code violations cited and alarms turned in for the project area suggest that serious fire hazards exist and that the danger of major fire losses is real. One can only assume that without corrective action, either through new construction or building rehabilitation, the danger will continue and probably become more serious.

POLICE PROTECTION SYSTEM AND CAPACITY - S24, 25

The City of Boston's Police Department is organized into 15 districts. The project area is within District #1 and abuts District #4. The boundaries for these districts and the locations of Police Headquarters and the District #1 Station are shown on the Public Safety map.

Existing Conditions (1975)

Approximately 240 uniformed officers each are assigned to Districts 1 and 4. Their cheif responsibilities are: crime prevention and criminal apprehension, traffic control and emergency assistance.

According to Police Department crime analysis records, street crime in the form of larceny, prostitution, drug pushing, robbery and auto theft is the principal crime problem for the project area. Among the factors which may contribute to this problem are: the proliferation of bars and nightclubs within the area and the presence of the bus station, (all of which attract a large nighttime transient population); and vacant lots, narrow alleyways and inadequate street lighting.

In response to these problems the City has undertaken a campaign to reduce the fear of crime as well as the actual crime level in the area. The key objectives of this campaign include: installation of brighter street lighting; institution of more frequent street cleaning; and assignment of mounted police officers to the theater district along Boylston and Tremont Streets.

The other aspect of special police involvement in this area relates to traffic control duties. Several intersections with heavy traffic congestion, such as Stuart, Columbus and Arlington; Tremont and Stuart; and Boylston and Tremont have traffic policemen assigned to them regularly.

Projected Conditions (1985)

A widespread feeling exists that the crime rate in the surrounding project area including the Adult Entertainment District, Bay Village and Back Bay will continue to increase, perhaps at a rate faster than national urban trends. Whether the program of public actions and community involvement to bring increased patrol, better lighting, and tougher measures against criminals can arrest this trend cannot be determined at this time.

Table 1

Crime Patterns: Reported "Part I" Offenses

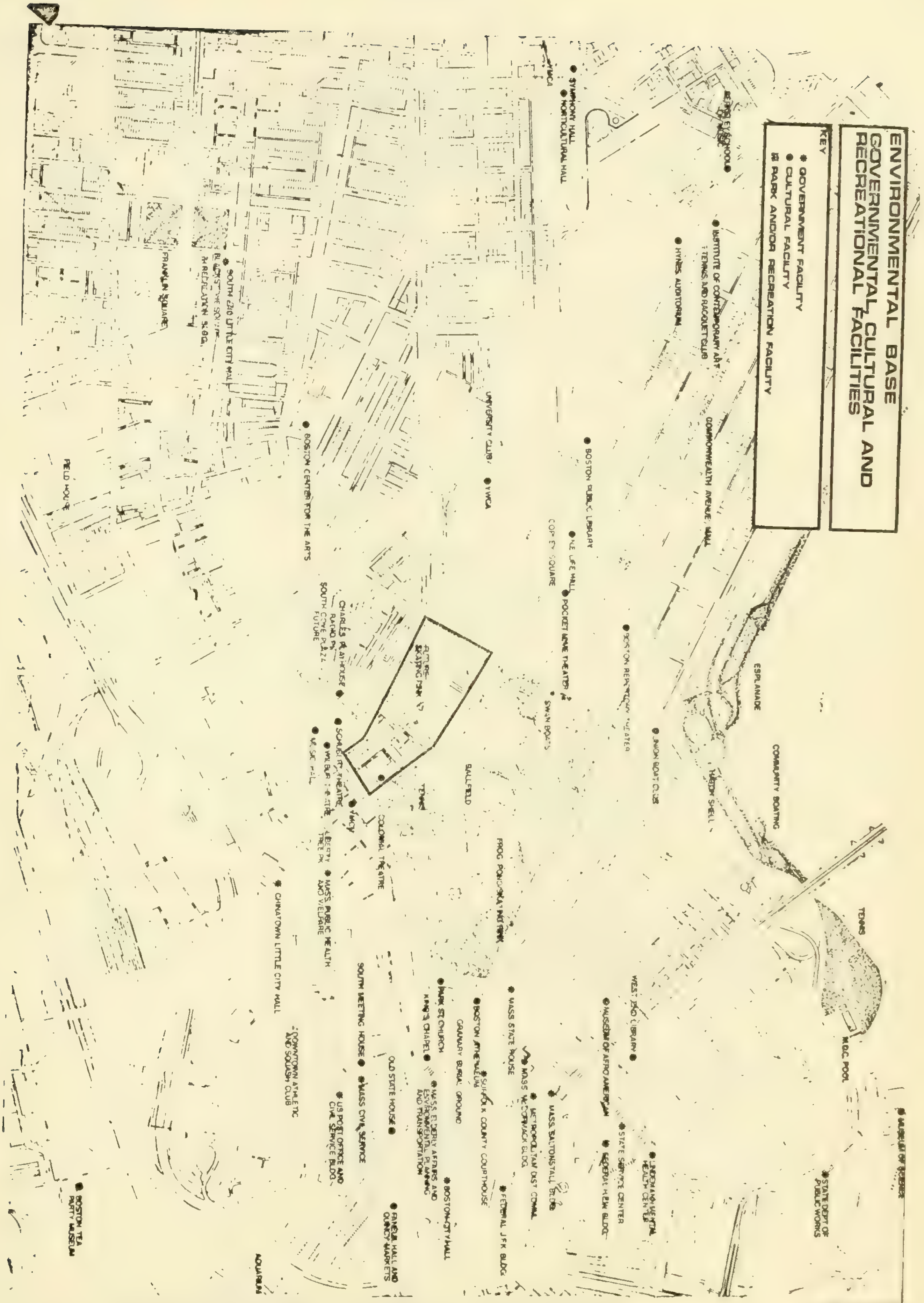
Category	Project Area [a]		South Cove [b]		Prudential [c]		City	
	1973	1974	1973	1974	1973	1974	1973	1974
Murder and non negligent manslaughter	0	0	2	1	0	0	135	134
Rape	0	3	7	4	1	2	376	351
Robbery	26	37	57	59	46	39	5,969	7,195
Aggravated assault	6	9	37	17	4	6	2,190	2,582
Burglary	11	21	36	56	24	41	13,731	16,403
Larceny	57	122	134	205	194	252	12,093	16,686
Auto Theft	93	80	201	218	50	74	17,998	22,371
Total	193	272	474	560	319	414	52,492	65,722

[a] Includes Park Plaza project area Statler parcel and Public Garden

[b] Includes area bounded by Stuart, Arlington, Corning and Tremont Streets

[c] Includes area bounded by: Exeter, Huntington Belvidere, Dalton Boylston

Source: Bureau of Informational Services, Police Department, Boston



ENVIRONMENTAL BASE GOVERNMENTAL, CULTURAL AND RECREATIONAL FACILITIES

KEY
- ✱ GOVERNMENT FACILITY
- ● CULTURAL FACILITY
- ▨ PARK AND/OR RECREATION FACILITY

PARK PLAZA BUILDING STUDY STAGE
ENVIRONMENTAL IMPACT ANALYSIS

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PARKS AND RECREATION SYSTEM AND CAPACITY - S30, 31

The project borders the Boston Common and the Public Garden. The other major open space downtown, the Charles River Esplanade, is ½ mile away. Other amenities which also serve the downtown area include: the Commonwealth Avenue Mall, Copley Square, burial grounds, and small parks like the Boston Five Cents Savings Bank park.

Existing Conditions

Inadequate maintenance of the heavily used downtown parks, particularly the Common and Garden, is a crucial problem. These areas might begin to withstand the existing pressures on them if additional funds were made available for parks maintenance.

Boston has 3 acres of open space for active and passive use per thousand residents, while downtown has a ratio of 3.2 acres per thousand. The ratio for downtown appears to be comparable to the city norm, but it reflects neither the fact that downtown has less than half the standard amount of playground space, nor the demands placed on all downtown spaces by workers and visitors.

Existing recreation facilities include: a ballfield on the Common, (3) public tennis courts on the Common and Charlesbank, private at Boston Harbor Tennis Club; outdoor public swimming pools at West End and North End, outdoor at YMCA, YWCA, YMCU; artificial ice rink at the Frog Pond on the Common, natural ice on the Lagoon at the Public Garden; public sailing facilities at Community Boating on Charles River. Many private health and athletic clubs.

Based on the planning design standards described on the following page: the two outdoor swimming pools provide adequate service; an indoor skating rink should be available to downtown residents; and an additional 15 tennis courts could be supported by downtown residents (the four existing courts are overcrowded).

Projected Conditions

Projected increases in population, jobs, and visitors will add to the demands on the existing open spaces. Of the eight acres of parks planned for downtown, one playground is in the Back Bay and one park is in South Cove. The remainder are in the Waterfront, North End and business district.

If the downtown population increases by 15,000 to 23,000 from 1970 to 1985, then an additional 7 to 10 tennis courts and an additional outdoor swimming pool would be needed. An open-sided skating rink is planned for the North End. No other public recreational facilities are currently scheduled for downtown, with the exception of indoor facilities in connection with the new school (e.g. Quincy).

Planning Design Standards *

Facility	Service Area	Population Served	Acres per 1000 residents
Playground	¼ to ½ mi	10,000-12,000	.5
Playfield	1 to 1½ mi	60,000-75,000	.2 or .15
Neighborhood Park	¼ to ½ mi	10,000-12,000	.5
Regional Park	5 miles	metropolitan area	.5
Tennis Court - public	½ hour		
Tennis Court - private	½ hour	2,000 private sector	
Outdoor Swimming Pool	½ hour	20,000	
Outdoor Skating Rink	½ hour	75,000 *	

(MDC area has one indoor skating rink per 41,000 population)

Note: There are no standards for open space to be used by office workers. Quality of space is directly related to intensity of use. Well-designed, accessible plazas or parks in a new development are needed if the new open space is to relieve the pressure on existing facilities.

* from Philadelphia Comprehensive Plan and Massachusetts Department of Natural Resources

CULTURAL SERVICES SYSTEM AND CAPACITY - S32, 33

The city's four major legitimate theaters and the Music Hall are within one block of the project. The main Boston Public Library is ½ mile west of the project. Symphony Hall is about 1 mile away. Many halls and churches used by local theater groups and the Boston Center for the Arts are within ½ mile of the project. There are about 30 more movie theaters downtown. The city's major museums are all a mile or more away; for a complete summary refer to the Community Facilities map.

Existing and Projected Conditions

Attendance at commerical theaters varies with the quality and quantity of productions; 1972-73 was a high attendance year with more than 1-million tickets sold while 1970-71 and 1973-74 were low attendance years. According to a study by the Baker Research Corp. in March 1973, nearly one-third of Boston area cultural organizations report deficits.

These cultural organizations and commerical theaters seek the support of Boston residents. Theaters in particular would benefit from increased interest among downtown residents.

Solid Waste Management System And Capacity - S34, 35

The project area is part of Sanitation District 1 established by the Public Works Department; the District encompasses the entire downtown reaching west to Massachusetts Avenue.

Existing Conditions (1975)

Solid waste is collected from residential and commercial property by private contractors who use their own equipment and personnel. Combustible solid waste collected in the City is hauled to either the South Bay incinerator or to the City's sanitary landfill on Gardiner Street, West Roxbury. Residue from the incineration process as well as all noncombustibles and bulky wastes are hauled to the landfill. The Public Works Department has contracted with Sanitas for waste collection in District 1. The collection schedule for this area is three pickups per week. In 1974, 33,000 tons were collected from this area. The City's policy of permitting free dumping of refuse collected from commerical property has resulted in Sanitas collecting most of the commercial refuse in District 1. The volume of refuse (processed through incineration, and thereby reduced in weight) disposed of at the Gardiner Street landfill was 326,000 tons in 1974.

According to the Public Works Department 50 per cent of the solid waste collected by contractors to the City is processed through the city-run incinerator before being dumped at the Gardner Street landfill.

Projected Conditions (1985)

The Environmental Protection Administration (EPA) has obtained a Cease and Desist Order requiring the City to modify its waste disposal system, effective July 31, 1975. Currently the City is considering several options, including hauling to landfill sites outside the City, in response to the EPA order.

The projected volumes of waste for the entire City by 1985 is estimated to be 460,000 tons, (or about a 70 per cent increase over the next ten years) and 56,100 tons for District 1 (without Park Plaza).

1985 BASE ECONOMIC ENVIRONMENT PARAMETERS

The following economic environment parameters would be affected by the occupancy and use of the Park Plaza project:

SUB COMPONENT/PARAMETER		STATUS
Public Economic Structure:		
E02	Real property tax rate	Building Study Stage
E04	Non-property tax revenue	Building Study Stage
E05	User fee revenue	Building Study Stage
E06	Intergovt transfer revenue	Building Study Stage
E08	Bonded debt	Building Study Stage
E12	Public housing ooerating expense	Building Study Stage
E13	Housing subsidy expense (oper.)	Building Study Stage
E15	Education operating expense	Building Study Stage
E17	Health service operating expense	Building Study Stage
E19	Social service operating expense	Building Study Stage
E21	Police protection operating exp.	Building Study Stage
E23	Fire protection operating exp.	Building Study Stage
E25	Emergency operating expense	Building Study Stage
E27	Park and recreation operating exp.	Building Study Stage
E29	Cultural service operating exp.	Building Study Stage
E31	Solid waste management oper. exp.	Building Study Stage
E33	General govt. service oper. exp.	Building Study Stage
E35	Water supply operating expense	Building Study Stage
E37	Sewer system operating expense	Building Study Stage
E41	Public signal operating expense	Building Study Stage
E43	Public transit operating expense	Building Study Stage
E45	Other transportation oper. exp.	Building Study Stage
Private Economic Structure:		
E46	Capital investment land	Building Study Stage
E47	Capital investment buildings	Building Study Stage
E48	Capital investment fixed equip.	Building Study Stage
E49	Disposible personal income	Building Study Stage
E50	Rental lease income	Building Study Stage
E51	Sales income	Building Study Stage
E52	Interest income	Building Study Stage
E53	Rental lease expense	Building Study Stage
E54	Payroll expense	Building Study Stage
E55	Utility service expense	Building Study Stage
E56	Inventory expense	Building Study Stage
E57	Tax expense	Building Study Stage
E58	Interest expense	Building Study Stage
E59	Operation and maintenance exp.	Building Study Stage

Contained in this section is an analysis of existing and future development trends for these land uses: housing, office and hotel. The retail analysis, not shown here, will be included in the subsequent draft. All other economic base information is included in the project economic impacts which are described in Chapter V, The Project Alternatives.

Downtown Development Trends 1975 - 1985

Type of Use	1975 Inventory	Additional Supply est.	1985 Inventory proj.
Office	29,500,000 sq.ft.	10,500,000	40,000,000
Retail	5,900,000 sq.ft.	1,400,000	7,300,000
Hotel	7,500 units	3,800	11,300
Housing	21,000 units	12,000	32,000

Source:

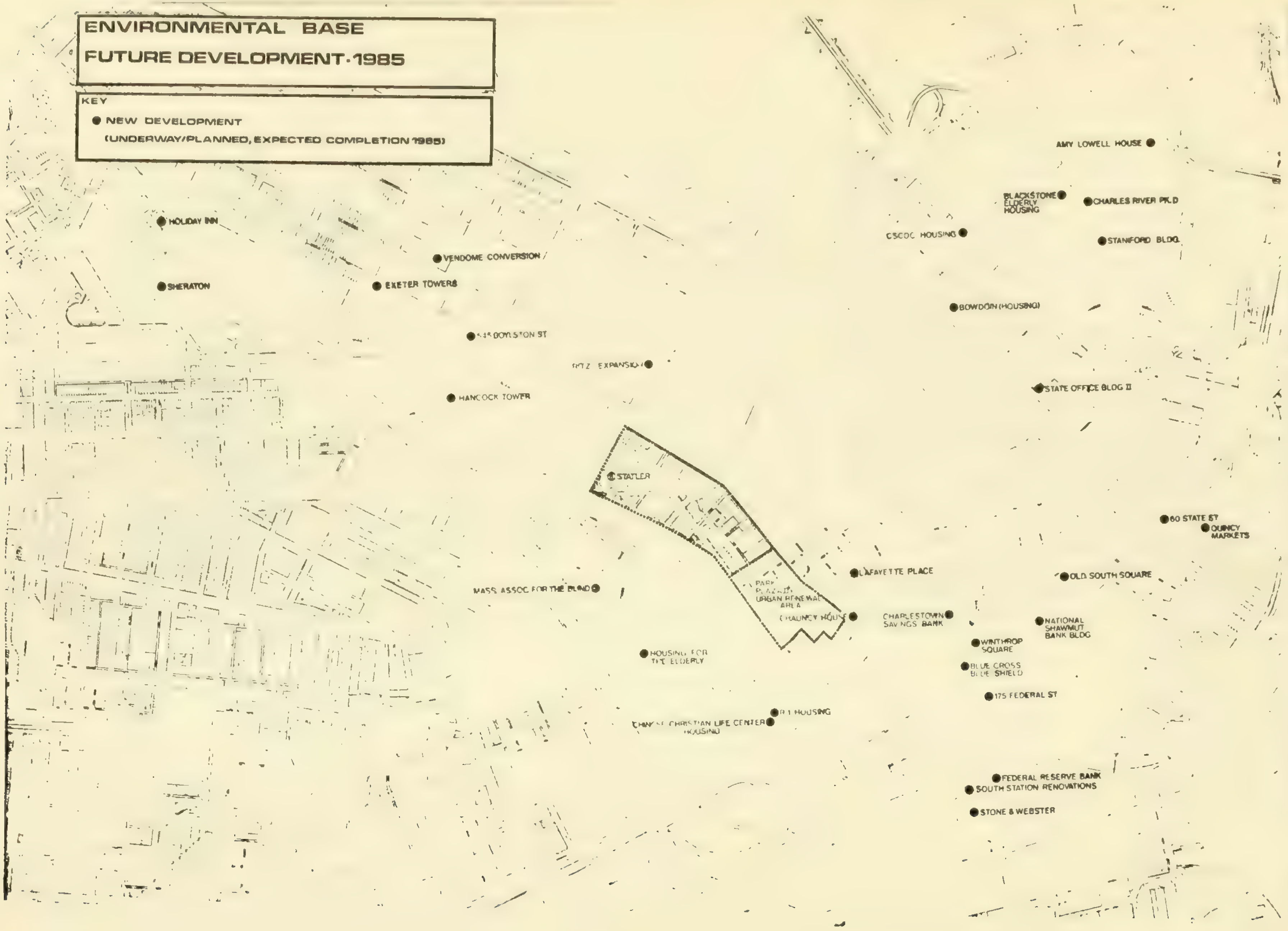
a. BRA Research Department

b. 1972 Chamber of Commerce Report, 1972

nventory of New Development

(Underway or Planned to be completed by 1985)

Project	Gross Additional Floor Space Office	Retail	Hotel	Housing	
CBD, West End, Waterfront					
Blue Cross/Blue Shield	1,100,000	5,000			
Federal Reserve Bank	950,000				
National Shawmut	1,150,000	10,000			
State Office Bld. II	650,000				
Quincy Markets	175,000	200,000			
60 State Street	750,000	5,000			
175 Federal Street	150,000				
Charlestown Savings Bank	130,000				
1 Winthrop Square		18,000			
Lafayette Place	1,200,000	610,000	750		
Chauncy House				87	
Old South Square	130,000	26,000		400	
Stanford Blg.	200,000	11,000			
Amy. Lowell-Eld.				150	
Charles River Park D				710	
lackstone-Eld.				280	
Other-Waterfront				800	(approx. including C-2, Sargent Wharf, other proposed)
SUBTOTAL	6,585,000	885,000	750	2,427	
Back Bay, Beacon Hill, South Cove					
Sheraton			430		
Hancock Tower	2,000,000				
545 Boylston	91,000				
Vendome Conversion				120	
Holiday Inn-Dalton			430		
Statler	(200,000)		700		
Boylston -Exeter		12,000		160	
Bowdoin				30	
CSCDC (P4-A)				65	
South Cove- R-7, R-4				380	
R-1 Nursing				120	
Chinese Ch. Life Ct.				120	
SUBTOTAL	1,891,000	12,000	1,560	875	
Total Underway or Planned	8,476,000	897,000	2,310	3,302	
Additional Projected, (Park Plaza or other)	1,024,000	523,000	1,690	2,698	
TOTAL	9,500,000	1,400,000	4,000	6,000	



PARK PLAZA BUILDING STUDY STAGE
ENVIRONMENTAL IMPACT ANALYSIS
PREPARED BY
BOSTON REDEVELOPMENT AUTHORITY
CITY HALL
THE SARATOGA ASSOCIATES
BRISTOL, LITYNSKI, WOJCIK, TARBOX, HOLLISTER, CINQUINO, AND MOORE PC
THE ARCADE
DATE 1975

BOSTON, MASSACHUSETTS

SARATOGA SPRINGS, NEW YORK

THE HOUSING MARKET

The demand for new quality apartments in Downtown Boston is a function of three basic factors: household income, locational preference, and mobility or migration pattern of the population. The demand for new quality housing in a market area increases as a result of inmigration of new middle- and upper-income families into the area; increases in household income of the existing population, which enables the household to afford higher quality housing; and changes in the locational preference of the population within the metropolitan area or within the market area itself. A recent study of the City's housing market indicates that, with regard to all three of the basic demand elements, the Downtown housing market should experience a significant increase in demand for new, high-quality housing over the next decade.[1]

Between 1960 and 1970, there was an increase of 68% in the number of households in the City of Boston earning between $15,000 and $25,000+; and for the metropolitan area, as a whole, there was a 107% increase in the number of households in this income bracket; (all measured in constant dollars at 1970 prices). Household income projections for City and Boston Metropolitan Area for 1980 and 1985 indicate a continuation of these basic growth trends; with the number of households earning over $15,000 increasing by 84% and 78% for the City of Boston and the Metropolitan Area, respectively.[2]

With regard to population trends, recent police census data (1973) indicates that the Downtown population has experienced a net increase of over 3% since 1970.[3] To some extent, the growth in population in the Downtown is the result of increased number of new middle- and upper-income housing. Since 1960, almost 4,500 units of new housing has been added to the Downtown; 3,000 during the decade of the sixties and 1,500 units in the first three years of the seventies.[4]

Further analysis of the recent population growth in the City, however, suggests a new trend and pattern of population migration pattern for the 25-34 year age group of the population. In response to the growth in jobs and increase in Boston's service-oriented economy, and the

changing life styles of this younger population, which shows a basic preference for City living, there has been a significant net inmigration of this group into the City Core Area. The new incoming population tend to be high-skilled, professional and in the middle- and upper income brackets.[4]

Despite the significant increase in the number of new quality housing units in the Downtown area in the late sixties and early seventies, overall vacancy rates in the quality housing market has remained extremely low. A survey performed in the winter of 1973 for the BRA by Gladstone Assoc. found vacancy rates in recently built Downtown middle- and upper-income apartment buildings ranging from 0 to 3%. The overall vacancy rate of these apartments-with the exception of Harbor Towers-was 2.8%.[5] As important as the low vacancy rate, as an indicator of high demand in this housing market, is the consistency with which it has remained low over the past several years. The result of a similar survey conducted by Gladstone Associates in the summer of 1971 were essentially the same as those found one and a half years later. The low vacancy level for this market is well below the 4 to 6% normal turnover or "frictional" rate. This tight market condition has resulted, in some cases, in long waiting lists, and demonstrates a consistent strong demand for quality apartment development in the Downtown area of Boston.[5]

One of the basic factors which has attracted residents into the new Downtown high-rise apartments, along with the changing locational preference for City living, has been the proximity to work. In a recent survey of high-rise apartment dwellers in the Downtown, the overwhelming reason for choice of location was convenience to employment. Secondary in importance was proximity to shopping, restaurants, cultural activities, and "City life" in general.[6]

Therefore, it is reasonable to assume that growth in Downtown employment will be the key element in the increase in demand for new housing. We have projected that over the next ten years the City of Boston will gain nearly 80,000 new jobs, of which at least 50,000 of these, or 60% will be located in the Downtown area.[7]

Based on the employment projection, the current housing market demand, the recent trends of inmigration of 25-34

year olds into inner city areas, and the projected growth trends in household income, we have estimated that the Downtown housing market has the potential for absorbing between 12,000 and 23,000 new units of housing over the next ten years.[8]

The response to this potential future market for middle- and upper-income housing in the Downtown by residential developers has been relatively modest. The Boston Redevelopment Authority has been able to identify a total of 13,000 dwelling units, including Park Plaza, within Downtown developments which are either planned, proposed or in tentative stages of consideration. However, of the 13,000 identified, only 1,000 units are currently under construction; 34 units are in the planning stage (a building permit has been issued); 2,000 units are in the proposed stage* (the Building Department or public agency has received a formal proposal); leaving more than 9,000 units as "tentative" (discussed with some seriousness, but still at early stages of consideration). Thus, out of the 13,000 units only 1,034 are firmly committed.[9]

---

* Proposed stage units include the Park Plaza development. (A median figure for Park Plaza is used.)

Sources: Housing Market

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THE OFFICE MARKET

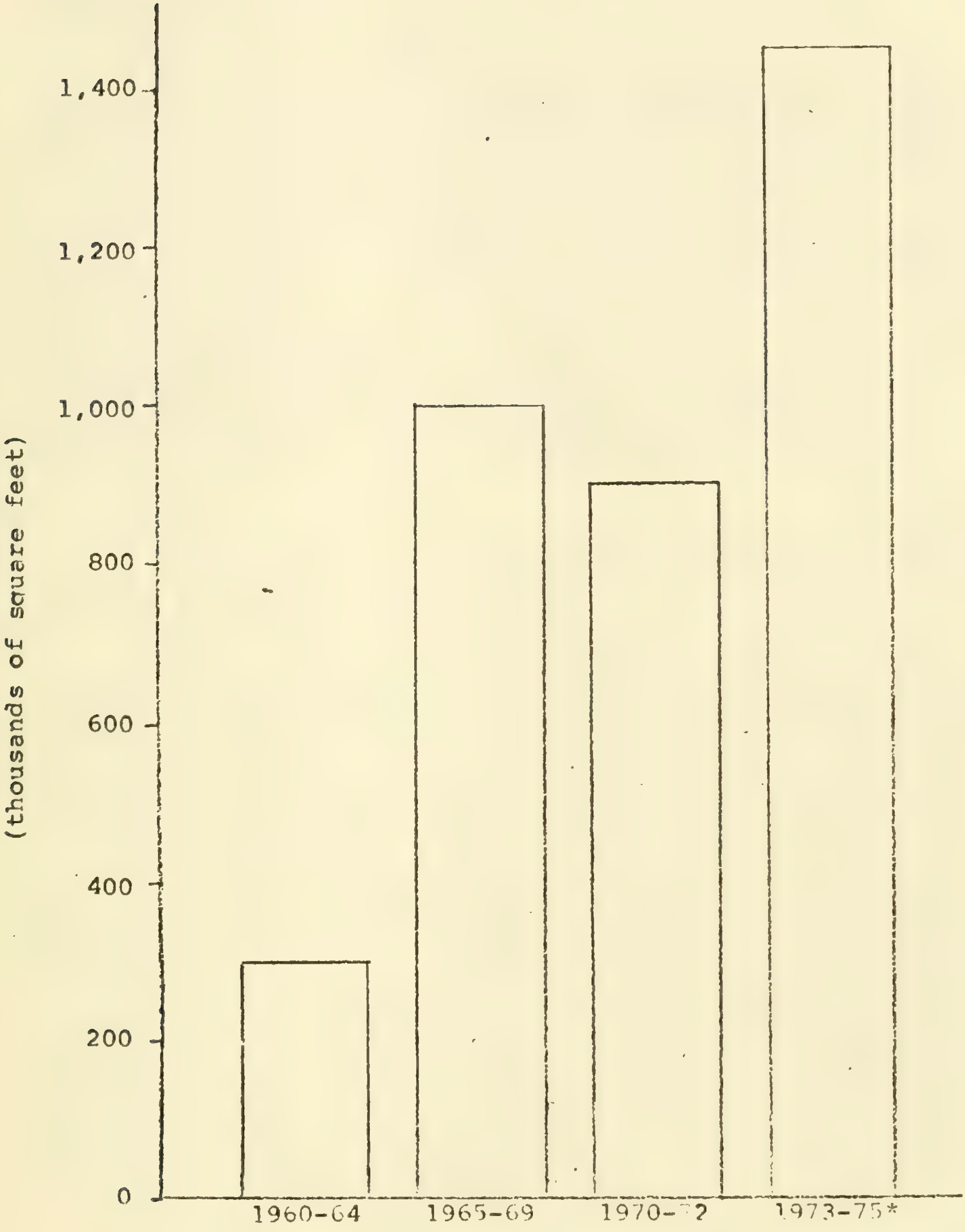
The analysis of market feasibility for Park Plaza office development follows the similar demand-supply approach, but the office market tends to be much more volatile than either the housing or retail markets, since it is more closely attuned to the changing local and national economic currents; and therefore, it is more difficult to predict the long-range market trends. However, we have developed a substantial amount of information on Boston's office industry, and combined with our indepth analysis of the trends and prospects for the local economy, we can develop a reasonable market profile to evaluate the Park Plaza office development.[1]

Office Market Trends

The Boston office market has experienced substantial growth over the last decade. From 1963 through the end of 1975, more than 16½ million square feet of new office space will have been constructed in the Downtown area; representing an 85 percent increase in the total Downtown office stock. Despite this substantial increase in office space, the office vacancy rate for the Downtown continued to decline throughout the sixties and reached an all-time low of 2.0 percent in 1970. With the deteriorating economy in the early 1970s, office vacancy increased to a high of 8.8 percent in late 1971. Since 1971, however, the vacancy rate has continued to decline to its present level of 7.4 percent (as of October 1974)[2] in spite of the addition of over 6.5 million square feet of new office space to the Downtown market from 1970 through 1974. In effect, Boston's Downtown is now absorbing office space at the annual rate of over 1.3 million square feet in comparison with 800,000 square feet a year, in the 1966-1970 period, and 300,000 square feet annually in the 1960-65 era.[3] At the present time, the Boston office market has one of the lowest vacancy rates of any major U.S. city.[4]

DOWNTOWN OFFICE MARKET SPACE

Average Annual Absorption Rate of Office Space



*Average annual absorption rate for the period 1973 through the first half of 1975.

Source: Boston Redevelopment Authority, Research Department and Ryan and Elliot Office Market Survey 1973-April [illegible]

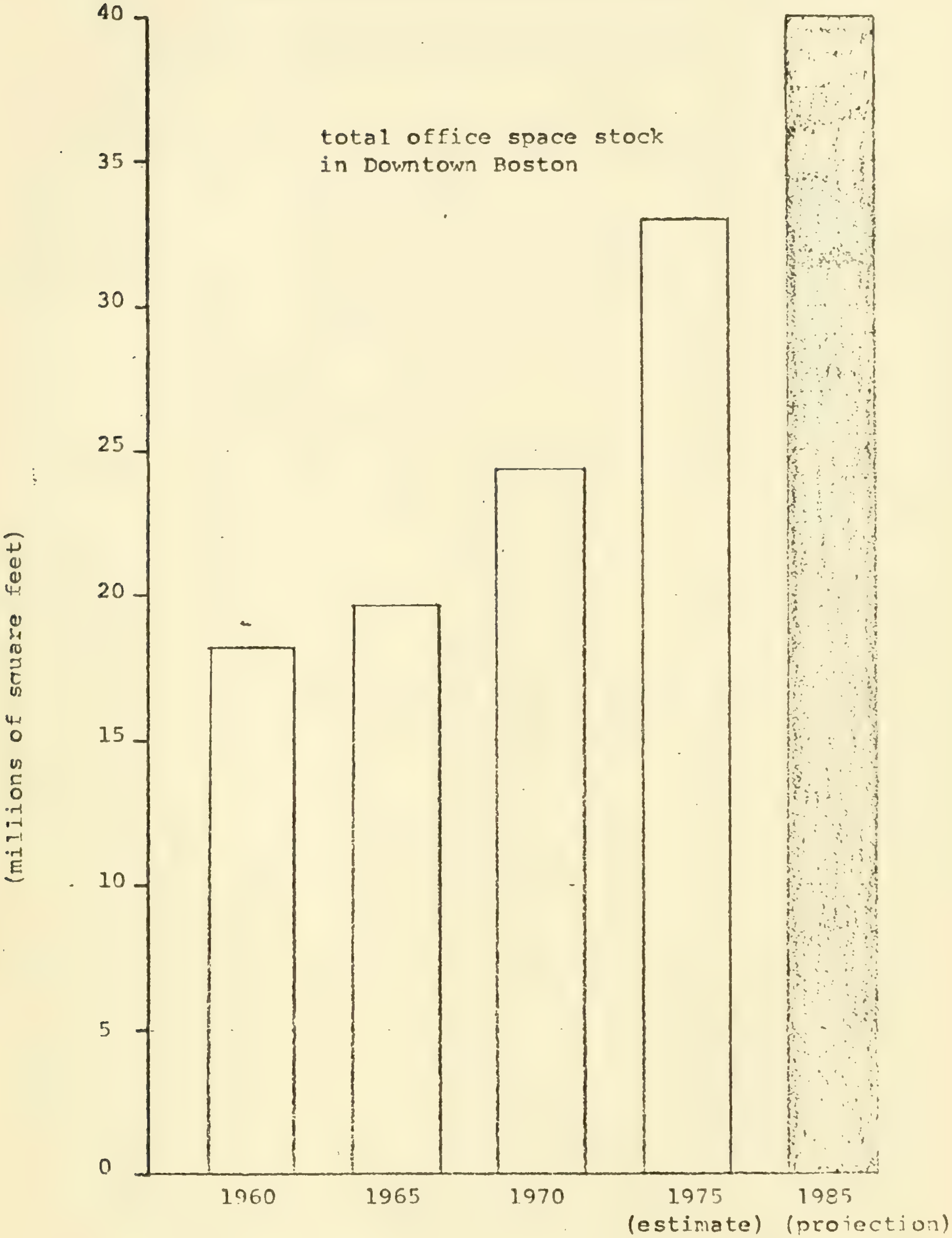
Supply and Demand

The current private office space stock in Downtown Boston is estimated at 29.5 million square feet with over 40 percent of this being Class A space. There is currently 8 million square feet of new office space now under construction, all of which is expected to be completed by the end of 1976 or early 1978; bringing the total office space stock in 1978 to approximately 37.5 million square feet. However, for the 1978-1985 period, we have, at this time, been able to identify a total potential of only 3 million square feet of new office space; including an average of 1.5 million square feet for the Park Plaza development, which would bring the total space stock in the Downtown to approximately 40.5 million square feet (allowing for some demolitions) by 1985.[5]

On the demand side, we have estimated that current (1974) "potential" demand for office space in the Downtown to be around 32.5 million square feet.

In estimating office space demand, we set the office market to equilibrium in 1929, (i.e., office demand equal to office space stock = 15 million square feet), and added the increments in demand to this base figure. The basic components in the growth of office demand are: (1) growth in Downtown office employment; (2) upgrading of office space (i.e., providing more office space per worker); and (3) the replacement of obsolescent office space. The growth in Downtown office employment was estimated from our detailed employment series for the City of Boston.[6] An industry-occupation matrix for key years was developed and an office worker allocation coefficient was applied to each of the matrix sectors to break out office workers by industry for the city.[7] The city-wide office employment was then allocated to the Downtown based on its share of total office space. Office employment was translated into office space needs by applying the average office space per worker ratio appropriate for the particular period.[8]

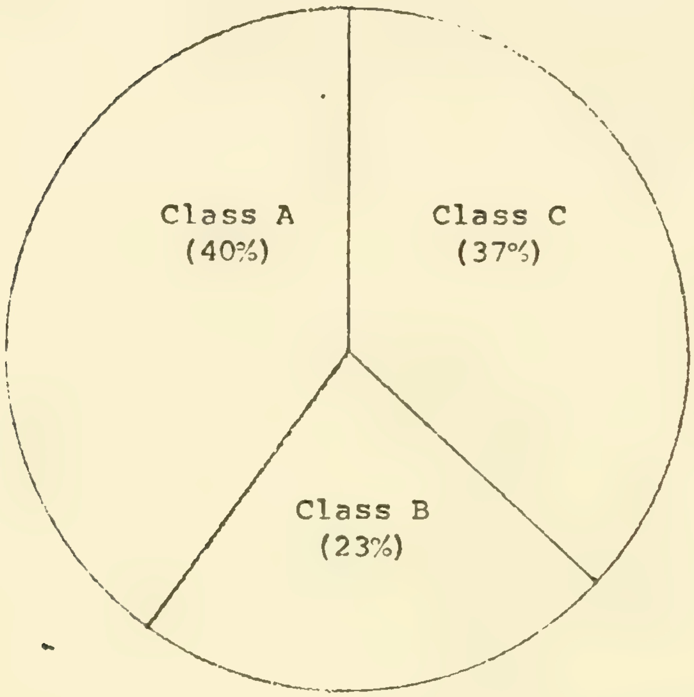
GROWTH IN THE SUPPLY OF DOWNTOWN OFFICE SPACE



Source: Boston Redevelopment Authority, Research Department

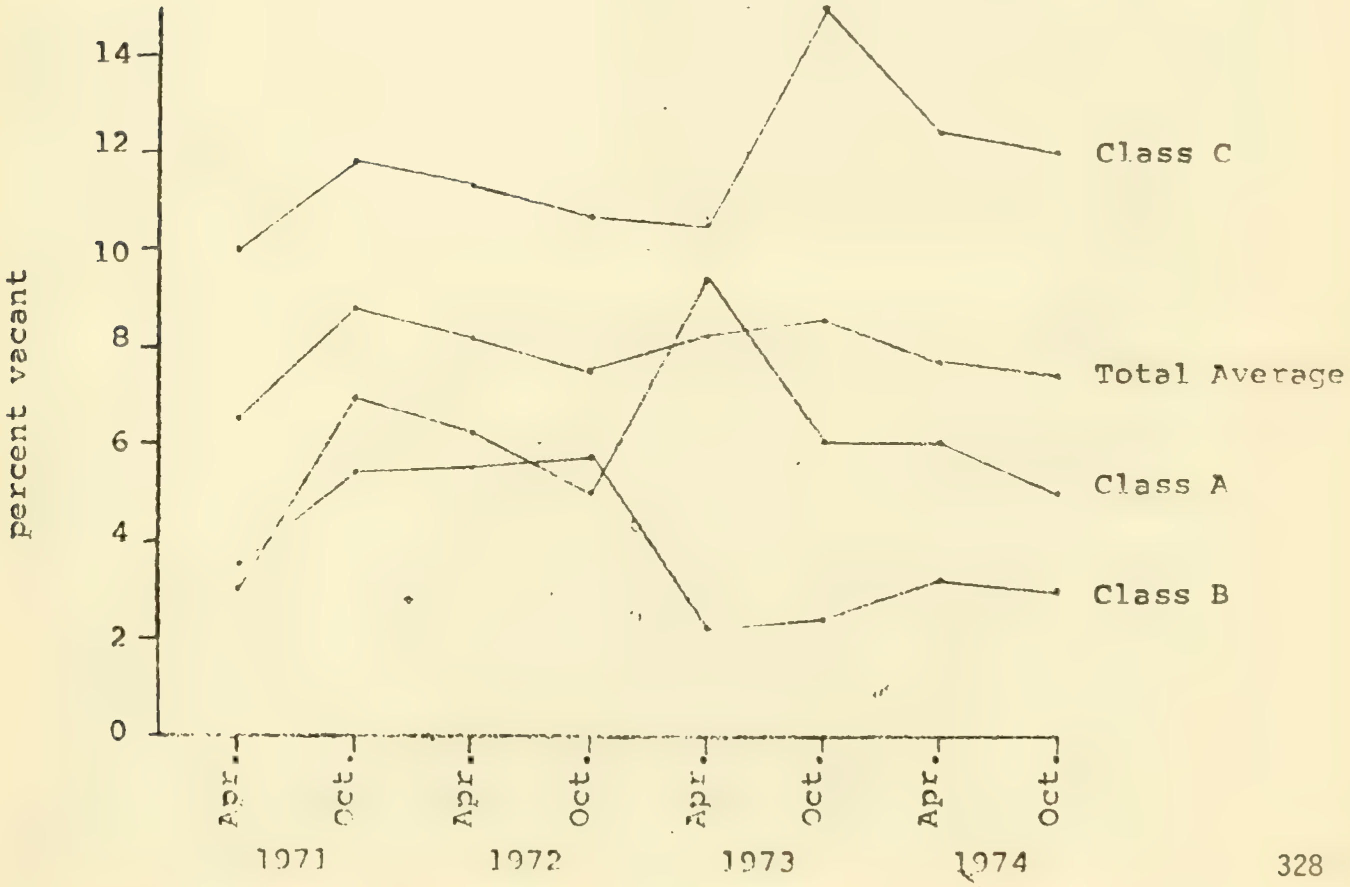
QUALITY OF OFFICE SPACE IN DOWNTOWN BOSTON

Distribution of Office Space by Class of Building



Source: *Real Estate Market Survey*, Ryan Elliot Co., April 1974.

Vacancy Rate by Type of Office Space



Source: *Real Estate Market Survey*, Ryan Elliot Co. 1971-74

The demand for additional space generated by the upgrading of office space was based on national BOMA survey data. The BOMA data indicated a steady increase in the amount of office space allocated per office worker. The increment in office space per worker was applied to the new office workers and to a certain percentage of existing office employment base which was gradually being upgraded as firms moved into newer office facilities.[8]

The demand for new office space generated by the replacement of obsolete office facilities was based on average economic life expectancy for standard office space of forty years. The Downtown office stock was distributed according to age of building and the amount of space that was obsolescent was determined for each time period. The amount of obsolescent space that had been or was expected to be upgraded through rehabilitation was subtracted from the total obsolete space replacement requirement and the remaining space, adjusted for demolitions, was calculated as the replacement requirement.[9]

Obviously, the above analysis, in calculating demand for new office space, assumes a certain pattern of behavior in the office market (i.e., that all new office workers are accommodated at the appropriate office space per worker ratio, and that obsolescent office facilities are replaced); therefore, we consider our demand as a "potential demand" figure, i.e., that these assumptions are operative in the office market.

Utilizing the above methodology and our most recent projections for employment growth in the City of Boston, we have estimated that potential demand for new office space will increase by 4.0 million square feet over the next years, bringing the total "potential demand" in Downtown office market to approximately 36.5 million square feet by the end of 1978. This compares to our "total office space stock estimate for 1978 of 38.0 million square feet, which leaves a 1.5 million square feet surplus of office space at the end of this period. However, office space demand is expected to increase by over 6.0 million square feet between 1978 and 1985; bringing total potential demand to 42.5 million in 1985, which exceeds the expected supply of office space by 2.0 million square feet.

The 10 million square feet projected growth in demand for new office space over the 12-year period is based on an increase in demand of 8.8 million square feet as a result of new office employment growth and 1.7 million square feet generated by upgrading and replacement needs.

The projected growth in office employment, which is the key to continued growth in demand for new office space, is based on detailed analysis of employment trends and occupational shifts projected for the City of Boston and the Boston SMSA, and have been adjusted to reflect the most current local economic trends, as well as the most recent national, regional and local employment projections compiled by the various state and national agencies.[10] The City's employment projections indicate a net gain in office employment for the Downtown area of approximately 41,000 over the next 12 years. Accommodating the new office workers in Downtown office space, given the current trends in office space per worker ratio, will require 8.8 million square feet of new space.

The brief office market analysis above indicates that the Boston office market is in relatively good shape, but will experience a slight surplus of space in the 1976-1978 period. However, it is expected that this surplus will be eliminated toward the end of the decade and potential demand will again continue to outstrip supply through the 1980s.

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THE HOTEL MARKET

The analysis of the impact of the proposed hotel for Park Plaza on the Downtown hotel market cannot follow the basic demand and supply approach used in the office and residential market analysis. Unlike the office and residential markets, new hotel development can generate, to some degree, its own demand through its ability to bring new business and convention trade into the City. For most large Downtown hotels, their primary market is the convention and business visitors. Although business visitors are a function of the general economic activities in a city, the convention business (particularly the larger conventions) is more closely tied to the availability of convention facilities and hotel accommodations.

An attractive city like Boston, with its large medical, educational and highly technical industries, has a good opportunity to expand its convention business if it had adequate facilities to accommodate the larger conventions.

Another important factor in generating demand for Downtown hotel facilities is the national and international linkages of the hotels. Many conventions are booked directly through the large national hotel chains. A city which has several national convention hotels has a good competitive advantage for the convention business.

The present Downtown hotel market of approximately 7,500 rooms is relatively strong. Boston has consistently had one of the highest average annual hotel occupancy rates of any major U.S. city, despite the addition of over 1,550 new hotel rooms since 1968.[1]

However, in spite of the substantial recent growth in new hotel space, Boston does not have adequate facilities to accommodate the large scale convention trade according to the Greater Boston Real Estate Board, Bureau of Conventions and Tourism.

Over the next ten years, some 3,800 new hotel rooms including the 800 for Park Plaza, are planned or proposed for the Downtown area. Since three of the proposed hotels will be convention-type hotels, it should certainly improve Boston's ability to accommodate the larger convention trade.

With the projected growth in the Downtown's business activities, the steady increase in the City's tourist trade, and the potential for capturing larger scale conventions, Boston's hotel market should continue to be strong.

A large, nationally-oriented convention-hotel facility in the Park Square area could contribute to the expansion of the City's hotel market.

---

[1] Harris, Kerr, Forster & Co. "Trends in the Hotel and Motel Business" 1971, 1973.

A COMPARISON OF HOTEL OCCUPANCY RATES WITH OTHER MAJOR U.S. CITIES AND NATIONWIDE AVERAGE

City	Average Annual Occupancy Rates 1969	1970	1971	1972
Boston	75%	69%	68%	69%
Atlanta	73%	67%	72%	76%
Baltimore	55%	52%	52%	51%
Chicago	63%	59%	54%	56%
Denver	68%	65%	65%	65%
Houston	58%	56%	53%	54%
Los Angeles	66%	62%	56%	62%
New Orleans	65%	58%	60%	61%
New York	75%	68%	64%	64%
Philadelphia	62%	56%	47%	50%
Washington, D.C.	69%	60%	61%	63%
Weighted Nationwide Average	62%	58%	59%	61%

Source: Harris, Kerr, Forster & Co: "Trends in the Hotel/Motel Business": 1971, 1973.

TOURISM IN BOSTON

Visitors to the City of Boston and Impact of Bicentennial

	Estimated Visitor Volume 1970[1]	Estimated Visitor Volume With Normal Growth 1975[2]	Projected Medium Visitor Volume With Bicentennial 1975[3]	Projected Visitor Volume Post-Bicentennial 1978[4]
Out of State Visitors (Pleasure and Business)	1,403,000	1,553,000	2,500,000	1,950,000
Mass. Residents Visitors (Pleasure)	1,500,000	1,660,350	2,800,000	1,980,000
Total All Visitors	2,903,000	3,213,350	5,300,000	3,930,000

Source: Analysis of the Impact of the U.S. Bicentennial on the City of Boston, Peter Menconeri, BRA Research Department, September, 1973.

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